SONY®

HD DIGITAL VIDEOCASSETTE RECORDER

HDW-2000
HDW-D2000
HDW-M2000/M2000P
HDW-S2000/S2000P

HD DIGITAL VIDEOCASSETTE PLAYER

HDW-M2100/M2100P

DIGITAL VIDEOCASSETTE RECORDER

DVW-2000/2000P
DVW-M2000/M2000P
MSW-2000
MSW-A2000/A2000P
MSW-M2000/M2000P
MSW-M2000E/M2000EP

DIGITAL VIDEOCASSETTE PLAYER

MSW-M2100/M2100P
MSW-M2100E/M2100EP

HD UPCONVERTER BOARD
BKMW-104

SDTI INTERFACE BOARD
HKDW-102

NETWORK INTERFACE BOARD
BKMW-E2000
BKMW-E3000

HDCAM

Digital BETACAM™

MPEG IMX Tele-File MEMORY STICK CINEALTA

MAINTENANCE MANUAL
Volume 1 2nd Edition (Revised 5)

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠ WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠ WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres.
Pour toute réparation faire appel à une personne compétente uniquement.

HDW-2000 (SY)	Serial No. 15001 and higher	MSW-2000 (SY)	Serial No. 10001 and higher
HDW-D2000 (SY)	Serial No. 16001 and higher	MSW-2000 (CN)	Serial No. 70001 and higher
HDW-M2000 (SY)	Serial No. 15001 and higher	MSW-A2000 (SY)	Serial No. 15001 and higher
HDW-S2000 (SY)	Serial No. 16001 and higher	MSW-M2000 (SY)	Serial No. 15001 and higher
HDW-M2100 (SY)	Serial No. 15001 and higher	MSW-M2000E (SY)	Serial No. 10001 and higher
HDW-M2000P (SY)	Serial No. 45001 and higher	MSW-M2100 (SY)	Serial No. 15001 and higher
HDW-S2000P (SY)	Serial No. 46001 and higher	MSW-M2100E (SY)	Serial No. 10001 and higher
HDW-M2100P (SY)	Serial No. 45001 and higher	MSW-A2000P (SY)	Serial No. 45001 and higher
DVW-2000 (SY)	Serial No. 10001 and higher	MSW-A2000P (CN)	Serial No. 70001 and higher
DVW-M2000 (SY)	Serial No. 10001 and higher	MSW-M2000P (SY)	Serial No. 45001 and higher
DVW-2000P (SY)	Serial No. 40001 and higher	MSW-M2000P (CN)	Serial No. 70001 and higher
DVW-M2000P (SY)	Serial No. 40001 and higher	MSW-M2000EP (SY)	Serial No. 40001 and higher
		MSW-M2000EP (CN)	Serial No. 70001 and higher
		MSW-M2100P (SY)	Serial No. 45001 and higher
		MSW-M2100P (CN)	Serial No. 70001 and higher
		MSW-M2100EP (SY)	Serial No. 40001 and higher
		MSW-M2100EP (CN)	Serial No. 70001 and higher

Attention-when the product is installed in Rack:

1. **Prevention against overloading of branch circuit**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please make sure that the rack does not overload the supply circuit.

2. **Providing protective earth**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please confirm that the outlet is provided with a suitable protective earth connection.

3. **Internal air ambient temperature of the rack**
   When this product is installed in a rack, please make sure that the internal air ambient temperature of the rack is within the specified limit of this product.

4. **Prevention against achieving hazardous condition due to uneven mechanical loading**
   When this product is installed in a rack, please make sure that the rack does not achieve hazardous condition due to uneven mechanical loading.

5. **Install the equipment while taking the operating temperature of the equipment into consideration**
   For the operating temperature of the equipment, refer to the specifications of the Operation Manual.

6. **When performing the installation, keep the rear of the unit 10 cm (4 inches) or more away from walls in order to obtain proper exhaust and radiation of heat.**

When using a LAN cable:

For safety,do not connect to the connector for peripheral device wiring that might have excessive voltage.

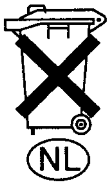
Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert "Batterie leer" oder nach längerer Gebrauchsdauer der Batterien "nicht mehr einwandfrei funktioniert". Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

For the customers in the Netherlands
Voor de klanten in Nederland

Hoe u de batterijen moet verwijderen, leest u in de Onderhoudshandleiding.

Gooi de batterij niet weg maar lever deze in als klein chemisch afval (KCA).



注意

指定以外の電池に交換すると，破裂する危険があります。
使用済の電池は，説明書に従って処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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Manual Structure

Purpose of this manual

This manual is the Maintenance manual volume 1 of the following models.

HD Digital Videocassette Recorder	HDW-2000/D2000/M2000/M2000P/ S2000/S2000P
HD Digital Videocassette Player	HDW-M2100/M2100P
SDTI Interface Board	HKDW-102
Digital Videocassette Recorder	DVW-2000/2000P/M2000/M2000P, MSW-2000/A2000/A2000P/M2000/ M2000P/M2000E/M2000EP
Digital Videocassette Player	MSW-M2100/M2100P/M2100E/M2100EP
HD Upconverter Board	BKMW-104
Network Interface Board	BKMW-E2000/E3000

This maintenance manual (Volume 1, 2, and 3) is intended for use by trained system and service engineers, and provides the information of maintenance and detailed service (parts replacement, guideline for adjustment, schematic diagrams, board layouts, detailed parts list).

This manual (volume 1) explains about maintenance information, parts replacement, and guideline for adjustment.

Related manuals

Besides this "Maintenance manual", the following manuals are available.

- **Operation Manual (Supplied with this unit.)**
  This manual is necessary for application and operation (and installation) of this unit.

- **Installation Manual (Supplied with this unit.)**
  This manual describes the information on installing this unit.

- **Protocol Manual of Remote (9-pin) Connector (available on request)**
  This manual explains the protocol for controlling the VTR via the RS-422A (9-pin serial remote). If this manual is required, please contact your local Sony Sales Office/Service Center.

- **Interface Manual of Parallel I/O (50-pin) Connector (available on request)**
  This manual explains the protocol for controlling the VTR via the parallel (50-pin). If this manual is required, please contact your local Sony Sales Office/Service Center.

- **"Semiconductor Pin Assignments" CD-ROM (Available on request)**
  This "Semiconductor Pin Assignments" CD-ROM allows you to search for semiconductors used in this unit.
  Semiconductors that cannot be searched for on this CD-ROM are listed in the maintenance manual volume 2 for the this unit. The maintenance manual volume 2 contains a complete list of all semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Contents

This maintenance manual (volume 1, volume 2, and volume 3) is organized by following sections.

Maintenance manual volume 1 (9-967-901-1X)

Section 1 Service Overview

Explains fundamental area of the information that is required to service, (removal of cabinet and cassette compartment, the functions of printed circuit board, the locations of main part, fixture and measuring equipment information, notes, etc.), the measures against trouble and ISR (Interactive Status Reporting).

Section 2 Error Message

Explains the error messages.

Section 3 Maintenance Mode

Explains each menu of the maintenance mode.

Section 4 Periodic Maintenance and Inspection

Explains the recommended periodic maintenance and the cleaning procedure.

Section 5 Replacement of Main Parts

Explains the replacement of mechanical parts, power supply unit, and circuit boards.

Section 6 Tape Path Alignment

Explains the tape path alignment after replacement of parts that are described in Section 5.

Section 7 Electrical Alignment after Main Parts Replacement

Explains the electrical alignment associated with replacement of parts that are described in Section 5.

Section 8 Electrical Alignment

Explains the electrical alignment for the maintenance of this unit.

Section 9 Video Head Projection Measurement

Explains the procedure for video head projection measurement.

Section 10 MPEG IMX Format Outline

Explains the MPEG IMX Format.

Maintenance manual volume 2 (9-967-902-1X)

Section 1 Spare Parts

Describes the exploded views, the mechanical parts list, and the electrical parts list.

Section 2 Semiconductor Pin Assignments

This section contains information on semiconductors used for unit.

It includes a complete list of the semiconductors and their ID Nos. for retrieving information on "Semiconductor Pin Assignments" CD-ROM, which is available separately.

Please refer to this section together with the "Semiconductor Pin Assignments" CD-ROM.

Information on the semiconductors not contained in the CD-ROM at the time of issue of this manual, if any, is given in this section as well.

Section 3 Circuit Description and Block Diagrams

Describes the circuit description and the block diagrams of overall and each board.

Section 4 Board Layouts

Describes the board layouts for the unit.

Maintenance manual volume 3 (9-967-903-1X)

Section 1 Schematic Diagrams and Frame Wiring

Describes the frame wiring and the schematic diagrams for the unit.

Section 1
Service Overview

Note

In this manual, the recorder and player are described separately.
The descriptions apply to the following models.

- Recorder : HDW-2000, D2000, M2000/P, S2000/P,
  DVW-2000/P, M2000/P,
  MSW-2000, A2000/P, M2000/P, M2000E/P
- Player : HDW-M2100/P,
  MSW-M2100/P, M2100E/P

1-1. Notes on Power Supply Block

Warning on Primary Circuit Block and Electric Shock

WARNING

The primary circuit consists of the AC inlet, the POWER switch, and the power supply unit.
Be careful not to receive an electric shock when performing the maintenance and service works with the power turned on.
A primary voltage remains applied to the AC inlet, and POWER switch even if the POWER switch is turned off.
For the work that requires no current conduction, therefore, turn off the POWER switch and disconnect the power cord.

1-2. Cleaning when the Heads are Clogged

Clean using a cleaning cassette tape (specified product: BCT-HD12CL) when the video heads are clogged.
For the cleaning, refer to "4-2-1. Cleaning using Cleaning Tape".

WARNING

Clean the video heads in the prescribed procedure using a specified cleaning cassette tape. If not, the video heads may be abrasive or damaged.

If the head clogging is not solved using a cleaning cassette tape, use cleaning cloth.
For the cleaning using a cleaning cloth, clean according to the procedure of "4-2-3. Tape Running Surface of Upper Drum and Video Heads Cleaning" after confirming the cautions and preparation in "4-2-2. General Information for Cleaning using Cleaning Cloth".

Note

The cleaning cassette tape BCT-HD12CL for HDCAM system can also use in DVW and MSW series.

1-3. Removing/Reattaching Cabinet

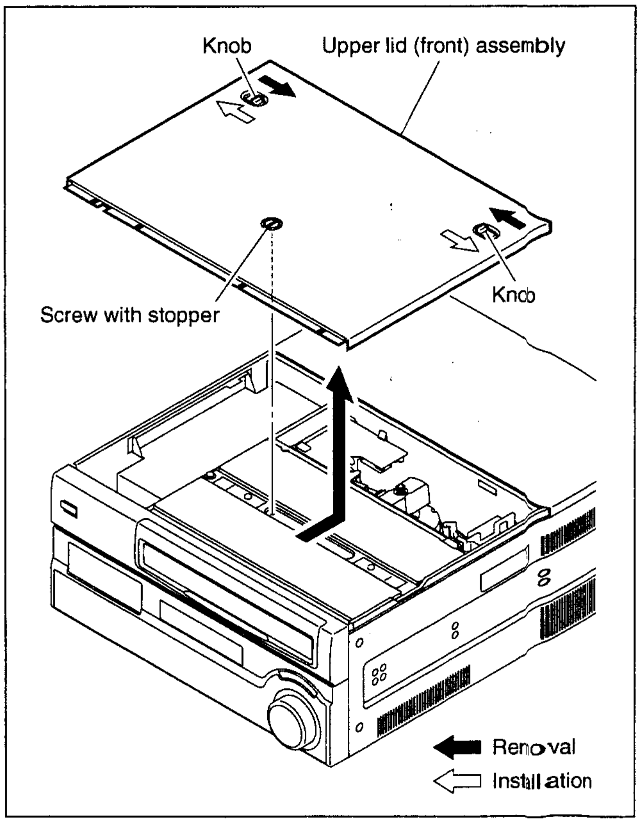
WARNING

Turn off the power and unplug the power cord before removing/reattaching.

1-3-1. Removing/Reattaching the Upper Lid

Upper lid (front) assembly

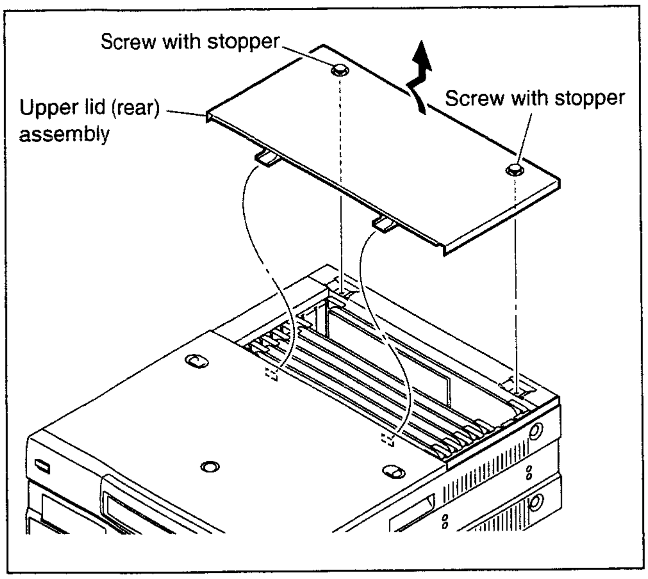
1. Loosen the screw with stopper completely.
2. Move the two knobs of the upper lid (front) assembly inwards. (To secure the upper lid (front) assembly, move the knob outwards.)
3. Hold the back of the upper lid (front) assembly, and pull out in the arrow direction.



When reattaching, install in the reverse order of removal.

Upper lid (rear) assembly

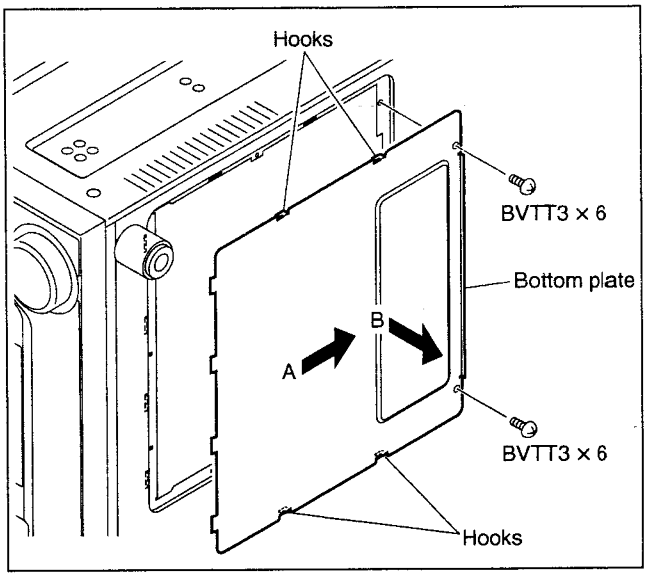
1. Loosen the two screws with stopper completely.
2. Hold the back of the upper lid (rear) assembly, and pull out in the arrow direction.


Screw with stopper
Upper lid (rear) assembly
Screw with stopper

When reattaching, install in the reverse order of removal.

1-3-2. Removing/Reattaching Bottom Plate

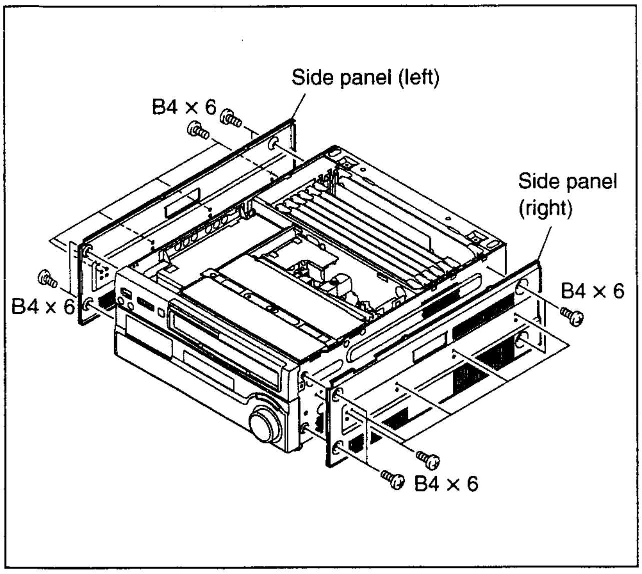
1. Place the unit with the side facing down.
2. Remove the two screws securing the bottom plate.
3. Slide the bottom plate in the arrow A direction to unhook, the four hooks.
4. Remove the bottom plate in the arrow B direction.


Hooks
BVTT3 x 6
Bottom plate
B
A
BVTT3 x 6
Hooks

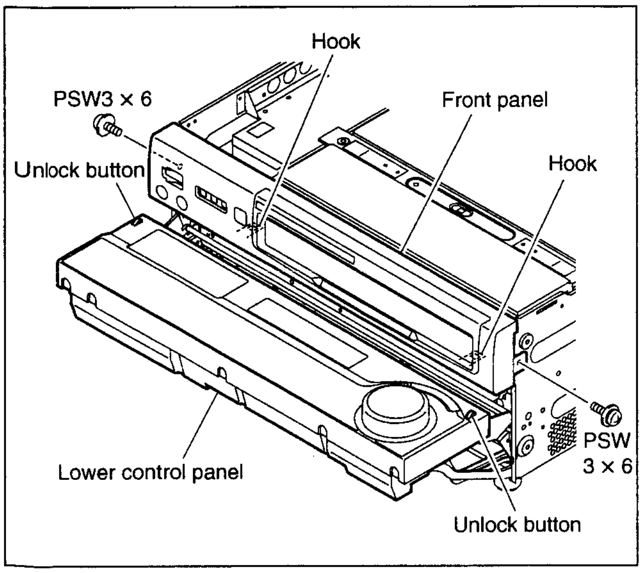
When reattaching, install in the reverse order of removal.

1-3-3. Removing/Reattaching Side Panels and Front Panel

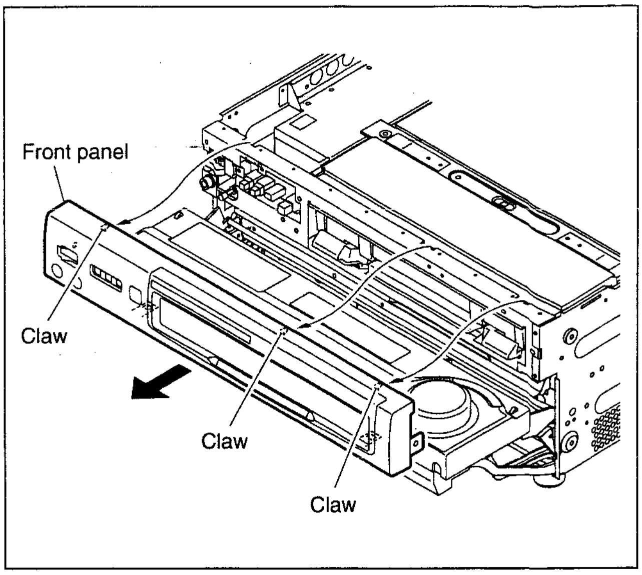
1. Remove the upper lid (front) assembly and upper lid (rear) assembly. (Refer to Section 1-3-1.)
2. Remove the nine screws, and side panels (right and left).


Side panel (left)
B4 x 6
Side panel (right)
B4 x 6
B4 x 6
B4 x 6

3. Remove the left and right screws (one each) securing the front panel.
4. Push the left and right unlock buttons, and open the lower control panel as shown in the figure.
5. Unhook the two hooks at the bottom of the front panel.


Hook
PSW3 x 6
Front panel
Unlock button
Hook
Lower control panel
PSW 3 x 6
Unlock button

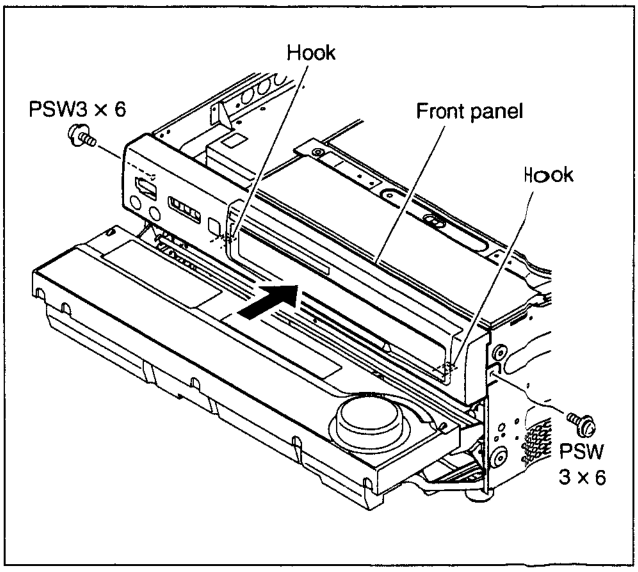
6. Release the three claws from the chassis, and remove the front panel in the arrow direction.


Front panel
Claw
Claw
Claw

When reattaching, install in the reverse order of removal.

Note

When reattaching, hook the two hooks at the bottom of the front panel to the convex portions of the chassis.


Hook
PSW3 x 6
Front panel
Hook
PSW 3 x 6

Note

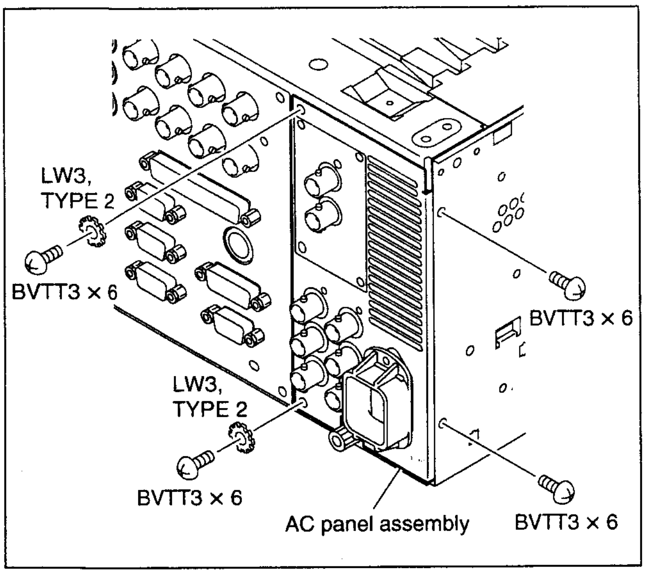
Use of screws other than specified will cause damage of the internal mechanism. Be sure to use the specified screws.

1-3-4. Removing/Reattaching AC Panel Assembly

WARNING

For your safety against electric hazards, be sure to turn off the power and unplug the power cord before removing/reattaching.

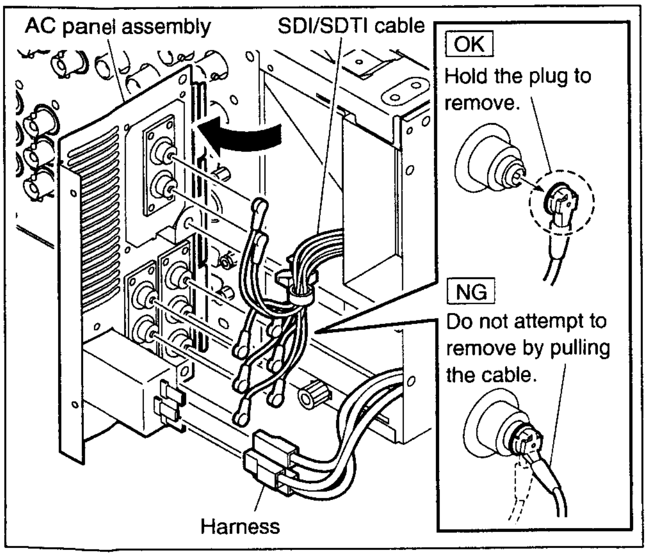
1. Remove the side panel (left). (Refer to Section 1-3-3.)
2. Remove the four screws and two washers securing the AC panel assembly.


LW3, TYPE 2
BVTT3 x 6
BVTT3 x 6
LW3, TYPE 2
BVTT3 x 6
AC panel assembly
BVTT3 x 6

3. Open the AC panel assembly in the arrow direction.
4. Disconnect all the harnesses/cables connected, and remove the AC panel assembly.

Note

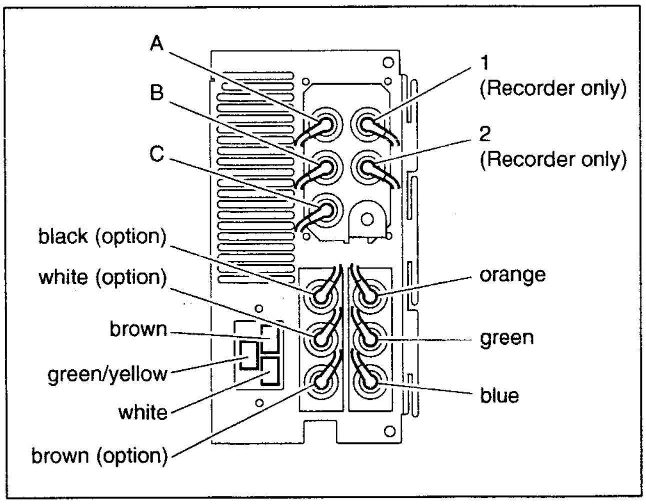
When removing the SDI cable and SDTI cable, hold the plug to remove. Do not attempt to remove by pulling the cable.


AC panel assembly
SDI/SDTI cable
OK
Hold the plug to remove.
NG
Do not attempt to remove by pulling the cable.
Harness

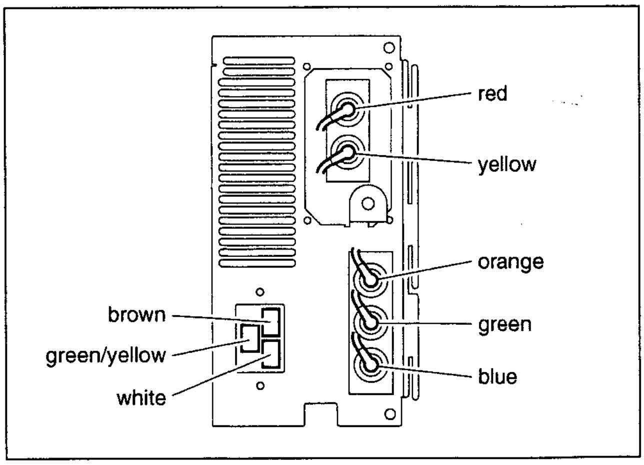
When reattaching, install in the reverse order of removal.

Note

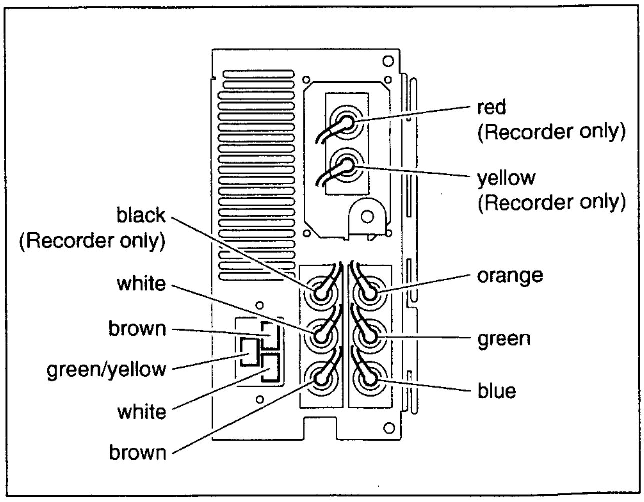
Connect the harnesses and cables correctly. (Refer to the figure below.)


A
B
C
1 (Recorder only)
2 (Recorder only)
black (option)
white (option)
brown
green/yellow
white
brown (option)
orange
green
blue

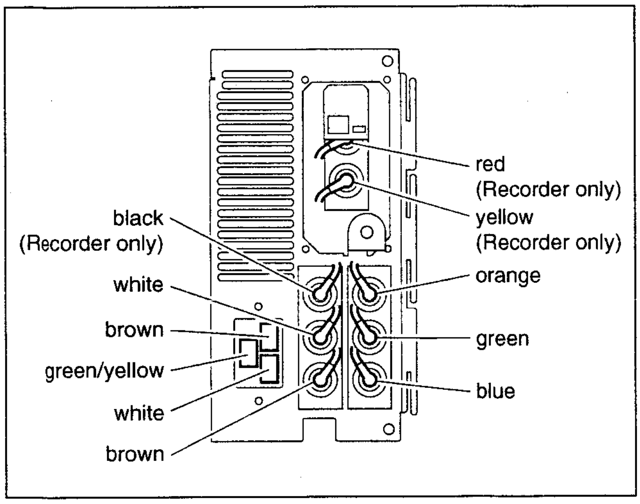
For HDW series


red
yellow
orange
green
blue
brown
green/yellow
white

For DVW series


red (Recorder only)
yellow (Recorder only)
black (Recorder only)
white
brown
green/yellow
white
brown
orange
green
blue

For MSW-2000/A2000/M2000/M2100


red
(Recorder only)
yellow
(Recorder only)
black
(Recorder only)
orange
white
brown
green
green/yellow
blue
white
brown

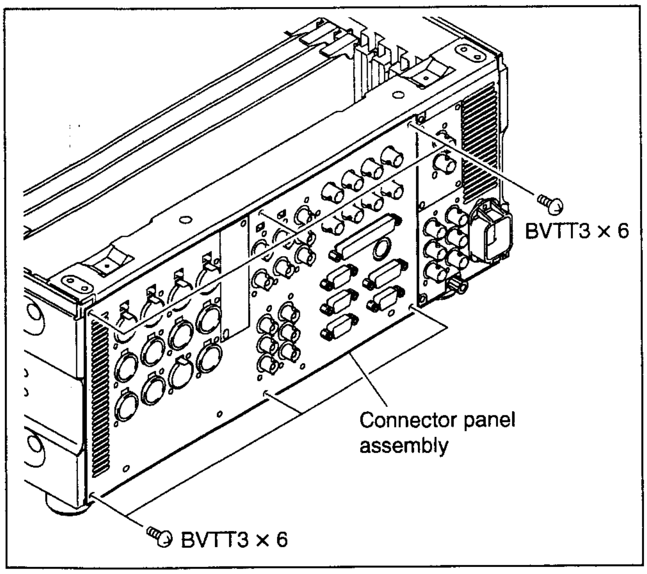
For MSW-M2000E/M2000EP/M2100E/M2100EP

1-4. Removing/Reattaching Connector Panel Assembly

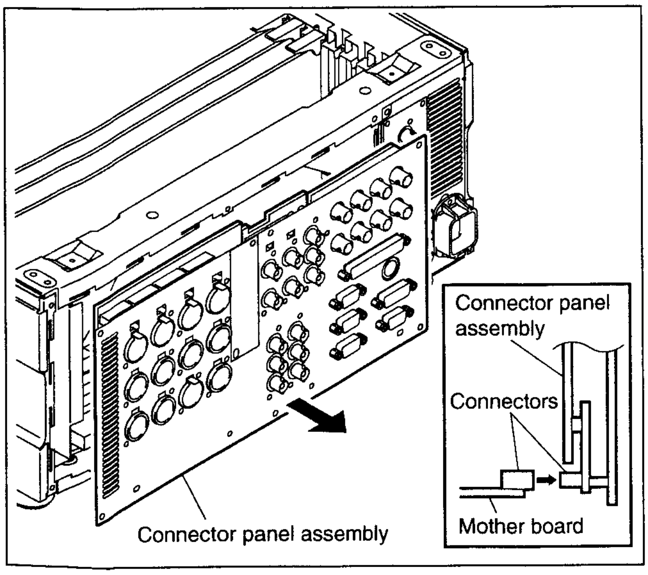
WARNING

Turn off the power and unplug the power cord before removing/reattaching.

1. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
2. Remove the VPR-64/91 board. (Refer to Section 1-12.)
3. Remove the six screws shown in the figure.


BVTT3 x 6
Connector panel assembly
BVTT3 x 6

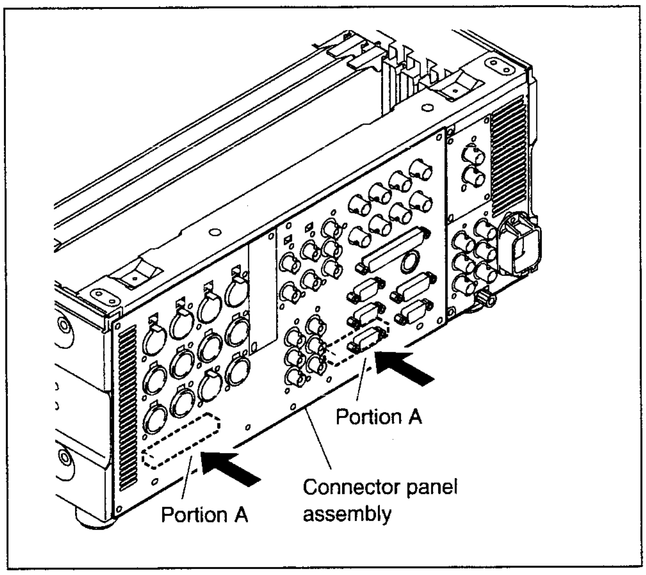
4. Push out the connector panel assembly from inside the unit in the arrow direction, and disconnect the connector connected to the mother board.


Connector panel assembly
Connectors
Mother board
Connector panel assembly

When reattaching, install in the reverse order of removal.

Note

Push in portions A of the connector panel assembly, and connect it firmly to the connector of the mother board.


Portion A
Portion A
Connector panel assembly

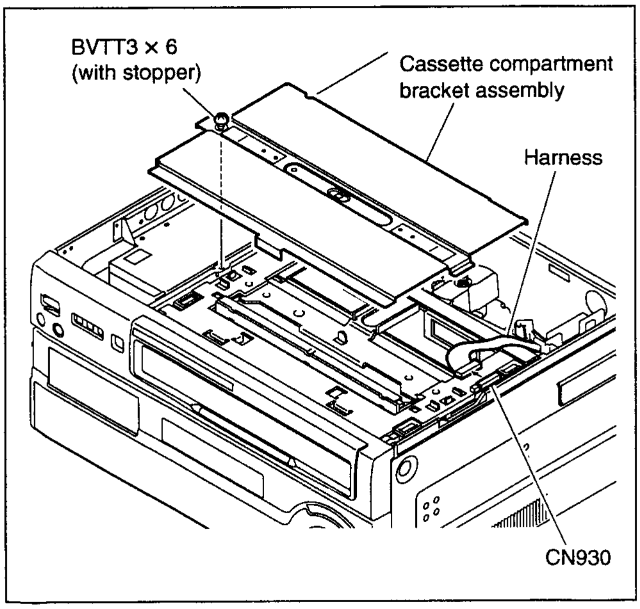
1-5. Removing/Reattaching Cassette Compartment

Notes

- Turn off the power before starting the removal/installation.
- The cassette compartment cannot be removed with the cassette tape inserted. Press the EJECT button with the power turned on to eject the cassette tape.
  If the cassette compartment does not move due to an electric trouble, take out the cassette tape manually. (Refer to "1-11. Taking Out the Cassette in Tape Slacking".)

Removal

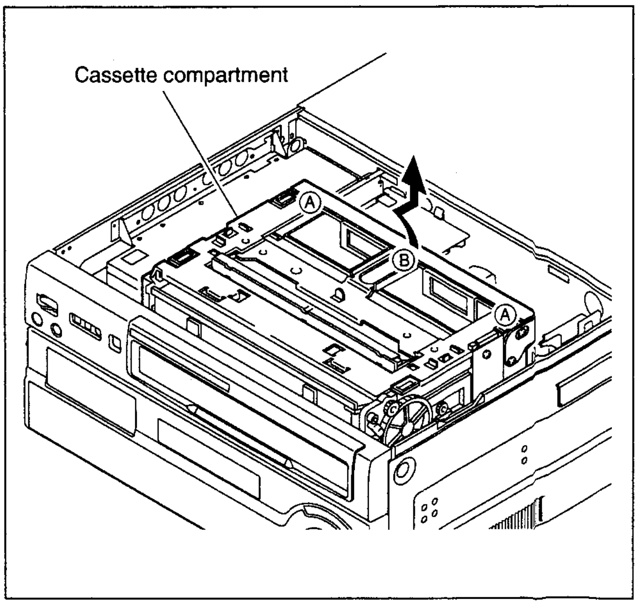
1. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
2. Loosen the screw, then remove the cassette compartment bracket assembly.
3. Disconnect the harness from the connector (CN930) on the CL-29 board. Keep the harness out of the way of the removal.



4. Hold the cassette compartment at the portions Ⓐ and lift up the cassette compartment slightly (by 1 cm). When the four cassette compartment positioning legs come off from the four positioning holes on a mechanical deck, shift the cassette compartment backward (by 1 cm) to the position where the cassette lid can be completely seen when viewed from just above.
5. Hold the cassette compartment at the portions Ⓑ, then slowly raise the cassette compartment upward to remove it.

Notes

- Being careful not to contact the gear on the right of the cassette compartment with the chassis, slowly raise the cassette compartment while slightly sliding it back-and-forth.
- Never move the cassette compartment to the right and left. If unnecessary force is applied to right and left, the gear or part may come off.
- Place the cassette compartment with the cassette lid up or with cassette compartment positioning legs down.
  (If it is put with the cassette lid down, the flexible card wire/board might be damaged.)



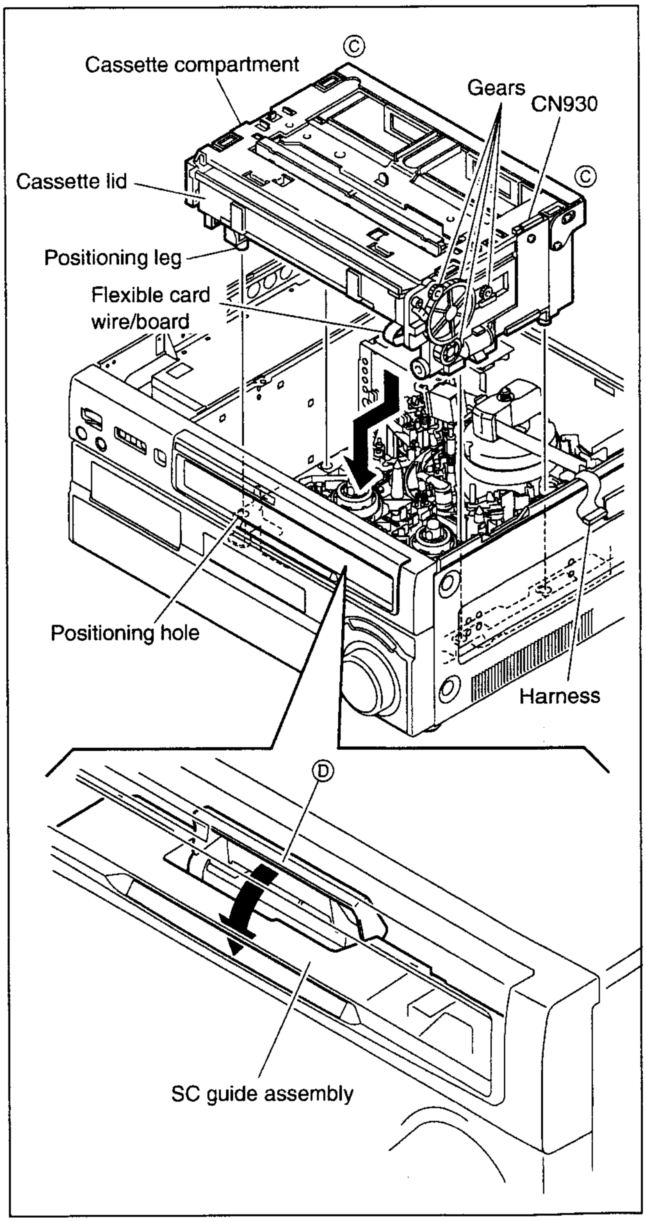
Installation

6. Place the cassette compartment into the unit in the direction as shown in the figure (with the cassette lid down).

   Notes

   - Being careful not to contact the gear on the right of the cassette compartment with the chassis, slowly insert the cassette compartment into the unit while slightly sliding it back-and-forth.
   - Never move the cassette compartment to the right and left. If unnecessary force is applied to the right and left, the gear or part may come off.

7. Press the portions Ⓒ of the cassette compartment as shown in the figure, and then fit the four positioning legs into the four positioning holes in the mechanical deck.
   Be sure to attach the cassette compartment while pressing down the portion Ⓓ of the SC Guide Assembly by fingers.
   If not, the cassette compartment cannot be attached properly because the back of the stage end of the cassette compartment blocks portion Ⓓ.


Cassette compartment
Ⓒ
Gears
CN930
Ⓒ
Cassette lid
Positioning leg
Flexible card wire/board
Positioning hole
Harness
Ⓓ
SC guide assembly

8. Connect the harness to the connector (CN930) on the CL-29 board.
9. Being careful not to pinch the harness, reattach the cassette compartment bracket assembly.
10. Reattach the upper lid (front) assembly.

1-6. Removing/Reattaching Lower Control Panel Unit

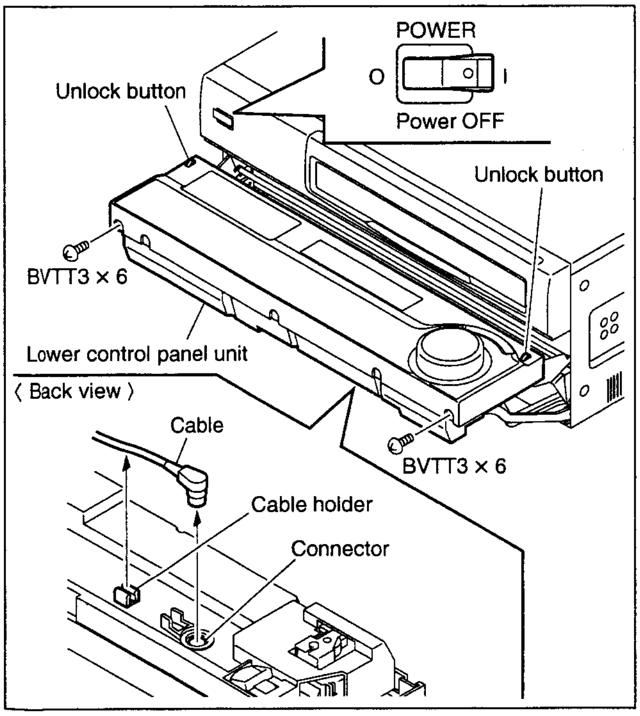
Removal

1. Turn off the power of the VTR.
2. Push the left and right unlock buttons, and open the lower control panel as shown in the figure below.
3. Disconnect the cable from the connector on the back side of the lower control panel unit and from the cord holder.

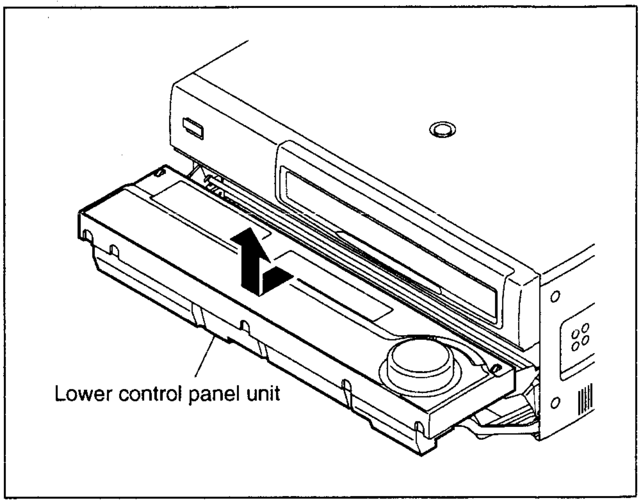
   Note

   Check that the power of the VTR is turned off before disconnecting cable. Disconnecting or connecting the cable in the power-on state will damage the control panel.

4. Remove the two screws shown in the figure.


POWER
O
I
Power OFF
Unlock button
Unlock button
BVTT3 x 6
Lower control panel unit
(Back view)
Cable
Cable holder
Connector
BVTT3 x 6

5. Lightly draw the lower control panel unit toward you, and then lift it upward.


Lower control panel unit

Installation

When reattaching, install the reverse order of removal, and use care about following points.

- If the arm is not protruded, press the left and right unlock buttons, then secure the arm to the 90° position.
- When reattaching the lower control panel unit to the arms, place the lower control panel with square holes of the panel aligned to the unlock buttons, slide it slightly to the VTR to attach.
- Check the screw holes are visible from your side before tightening the screws.

1-7. Circuit Function

Location No.	System	Models				
	Circuit function	HDW-				
	Boards name	2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P
		(Recorder)				(Player)
	Digital Process					
	Decoder (digital PB) processor, ECC outer decoder					
㉒, ④	**DPR-155 & DPR-195**	○	—	○	—	○
	DPR-155 & DPR-194	—	—	—	—	—
	DPR-155 & DPR-208	—	—	—	—	—
		↓		↓		↓
	DPR-229	○	○	○	○	○
	Digital Betacam/MPEG IMX Encoder (digital REC) processor (Bit reduction encoder, ECC outer encoder, MPEG2 SDTI input, MPEG2 SDTI output)					
㉓	**EPR-1**	—	—	—	—	—
	HDCAM SDTI interface					
③	**DIF-134**	○*1	○*1	○*1	○*1	○*1
	HD video signal processor (Video slow process, Video process down converter, Video process up converter)					
㉖	**HIF-1**	○	○	○	○	○
	HD video signal processor (Input filter, Bit rate reduction encoder, ECC encoder, Bit rate reduction decoder, conceal, Output filter)					
㉔	**HPR-1**	○	○	○	○	○
	HD SDI interface					
㉕	**SDI-63**	○	—	○	—	○
	HD SDI input/output	↓		↓		
㉕	**RX-80 & TX-96**	○	○	○	○	—
	HD SDI output					↓
㉕	**TX-96**	—	—	—	—	○
	Network interface					
㉖	**VN-13**	—	—	—	—	—
	Video stream, Audio signal interface					
③	**IF-886**	—	—	—	—	—
	Video process					
	Video signal processor (Composite decoder/encoder, Component A-D/D-A, SD SDI interface, Reference clock generator)					
㉗, ①	**VPR-64 & SDI-52**	○	○	○	○	○
	VPR-91 & SDI-52	—	—	—	—	—
	Analog BETACAM video PB (RF demodulator, TBC)					
㉑	**DM-123**	—	—	○	○	○
	Proxy audio/video signal prosessor					
②	**DSP-109**	—	—	—	—	—
	Audio process					
	Audio signal processor, AES/EBU interface, Audio signal A-D/D-A					
⑲	**APR-52**	○	○	○	○	○
	Analog BETACAM audio (LAU) PB EQ					
⑧	**AE-31**	○	○	○	○	○
	Analog BETACAM audio (LAU and AFM) PB circuit					
⑱	**AU-272**	—	—	○	○	○
	Cue REC/PB					
⑯	**CUE-13**	○	○	○	○	○
	Audio rate converter					
⑤	**RC-89**	○	○	○	○	○

*1: Option HKDW-102 *2: Option BKMW-104 *3: Option BKMW-E2000/E3000 *4: Option BKMW-E3000 ↓: Changed

DVW-		MSW-						Boards name
2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P	M2000E M2000EP	M2100 M2100P	M2100E M2100EP	
(Recorder)		(Recorder)				(Player)		
—	—	—	—	—	—	—	—	DPR-155 & DPR-195
—	—	○	—	—	—	—	—	DPR-155 & DPR-194
—	—	—	○	○	—	○	—	DPR-155 & DPR-208
		↓	↓	↓		↓		
○	○	○	○	○	○	○	○	DPR-229
○	○	○	○	○	○	○	○	EPR-1
—	—	—	—	—	—	—	—	DIF-134
○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2	HIF-1
—	—	—	—	—	—	—	—	HPR-1
—	—	—	—	—	—	—	—	SDI-63
—	—	—	—	—	—	—	—	RX-80 & TX-96
○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2	TX-96
—	—	○*3	○*3	○*3	○	○*3	○	VN-13
—	—	○*3	○*3	○*3	○	○*3	○	IF-886
—	—	○	○	○	○	○	○	VPR-64 & SDI-52
○	○	—	—	—	—	—	—	VPR-91 & SDI-52
—	○	—	○	○	○	○	○	DM-123
—	—	○*4	○*4	○*4	○	○*4	○	DSP-109
○	○	○	○	○	○	○	○	APR-52
○	○	—	○	○	○	○	○	AE-31
—	○	—	○	○	○	○	○	AU-272
○	○	—	—	○	○	○	○	CUE-13
—	—	—	—	—	—	—	—	RC-89

(Continued)

Location No.	**System**	**Models**				
	Circuit function	**HDW-**				
	Boards name	**2000**	**D2000**	**M2000** **M2000P**	**S2000** **S2000P**	**M2100** **M2100P**
		(Recorder)				**(Player)**
	RF process					
⑥	RF equalizer, ECC inner decoder **EQ-84**	○	○	○	○	○
	System/servo control					
⑳	System control, Servo control **SS-89**	○	○	○	○	○
⑨	Solenoid drivers (Pinch, Brakes, Cleaning), Motor drivers (Drum, Capstan, Reels, Threading, Reel shift, Cassette up/down), Rec inhibit sensors, Reel position sensors **DR-414**	○	—	○	—	○
		↓		↓		↓
	DR-508	○	○	○	○	○
⑦	DT driver **DT-47**	○	○	○	○	○
⑮	TC REC/PB circuit, TC/FULL erase OSC **TC-104**	○	○	○	○	○
	Mechanical deck driver/sensor					
㊺	Threading motor **CCM-15**	○	○	○	○	○
㊾	Demagnetization head **DU-107**	—	—	○	○	○
㊸	Pinch and Cleaning solenoid connection, Tape end sensor connection **HN-268**	○	○	○	○	○
㊹	Threading FG **PTC-102**	○	○	○	○	○
㊵	Cassette's hole sensor **PTC-99**	○	○	○	○	○
㊶	Loop antenna board **SE-606/606A**	○	○	○	○	○
㊷	S tension sensor **TR-119**	○	○	○	○	○
㊴	T tension sensor, Threading-end and Unthreading-end sensors **TR-120**	○	○	○	○	○
	Cassette compartment					
㊼	Lamp of cassette compartment **LP-81**	○	○	○	○	○
㊽	Cassette-in sensors, Cassette size sensor **PC-70**	○	○	○	○	○
㊻	Cassette up/down motor, Cassette down sensors **CL-29**	○	○	○	○	○

↓: Changed

DVW-		MSW-						Boards name
2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P	M2000E M2000EP	M2100 M2100P	M2100E M2100EP	
(Recorder)		(Recorder)				(Player)		
○	○	○	○	○	○	○	○	EQ-84
○	○	○	○	○	○	○	○	SS-89
—	—	○ ↓	○ ↓	○ ↓	—	○ ↓	—	DR-414
○	○	○	○	○	○	○	○	DR-508
○	○	○	○	○	○	○	○	DT-47
○	○	○	○	○	○	○	○	TC-104
○	○	○	○	○	○	○	○	CCM-15
—	○	—	—	○	○	○	○	DU-107
○	○	○	○	○	○	○	○	HN-268
○	○	○	○	○	○	○	○	PTC-102
○	○	○	○	○	○	○	○	PTC-99
○	○	○	○	○	○	○	○	SE-606/606A
○	○	○	○	○	○	○	○	TR-119
○	○	○	○	○	○	○	○	TR-120
○	○	○	○	○	○	○	○	LP-81
○	○	○	○	○	○	○	○	PC-70
○	○	○	○	○	○	○	○	CL-29

(Continued)

Location No.	System	Models				
	Circuit function	**HDW-**				
	Boards name	**2000**	**D2000**	**M2000** **M2000P**	**S2000** **S2000P**	**M2100** **M2100P**
		(Recorder)				**(Player)**
	Front panel					
⑪	Connection board, Memory label reader/writer					
	DIO-65	○	○	○	○	○
⑬	Memory Stick slot and interface, NV-RAMs, Switch panel function (Switches, Control panel connection)					
	FP-133	○	○	○	○	○
⑫	Memory card slot					
	FP-134	○	—	○	—	○
⑩	Upper control panel function (PHONES)					
	HP-101	○	○	○	○	○
㉜	Lower control panel function (Audio signal selection switches, Menu control switches)					
	KY-464	○	○	○	—	○
		↓	↓	↓		↓
	KY-569	○	○	○	○	○
㉘	Lower control panel function (Filed emission display, Audio setting display, Tape transport switches, Editing control switches, CONTROLPANEL connector)					
	KY-465	○	○	○	—	○
		↓	↓	↓		↓
	KY-570	○	○	○	○	○
㉞	Upper control panel function (Format indicators)					
	LED-357	○	○	○	○	○
㉙	Search dial					
	PTC-101	○	○	○	○	○
㉝	Upper control panel function (REMOTE, EJECT)					
	SWC-40	○	○	○	○	○
	SW-1106	—	—	—	—	—
㉚, ㉛	Lower control panel function (Audio REC/PB level VRs)					
	VR-262	○	○	○	—	○
		↓	↓	↓		↓
	VR-300	○	○	○	○	○
	Connector panel					
㊱	Connector board (Analog video)					
	CP-350	○	○	○	○	○
㉟	Connector board (Analog audio, Monitor, Time code)					
	CP-351	○	○	○	○	○
㊲	Connector board (Digital audio (AES/EBU), Remote control connectors)					
	CP-371	○	○	○	○	○
㊳	Connector board (Ethernet)					
	IF-885	—	—	—	—	—
	Others					
⑰	Motherboard					
	MB-884	○	○	○	○	○

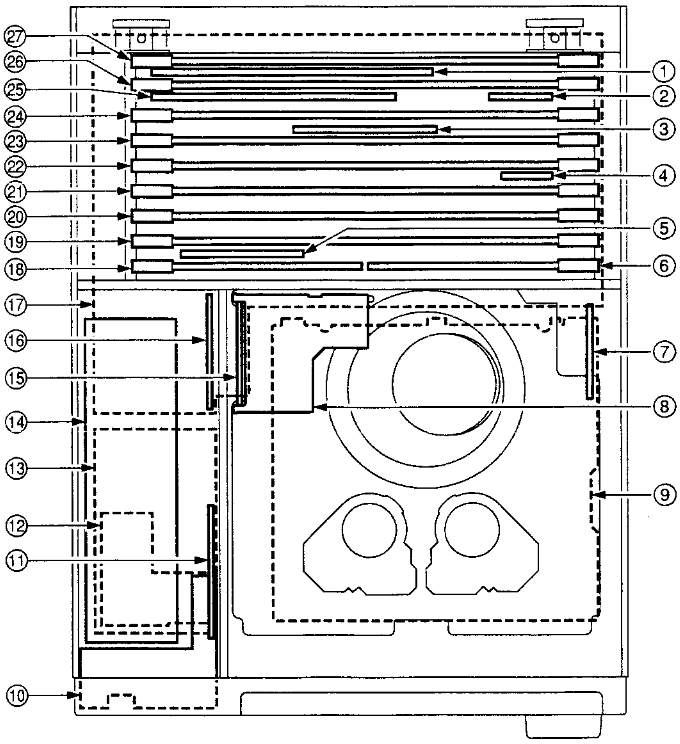
*3: Option BKMW-E2000/E3000 ↓: Changed

DVW-		MSW-						Boards name
2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P	M2000E M2000EP	M2100 M2100P	M2100E M2100EP	
(Recorder)		(Recorder)				(Player)		
○	○	○	○	○	○	○	○	DIO-65
○	○	○	○	○	○	○	○	FP-133
—	—	—	○	○	—	○	—	FP-134
○	○	○	○	○	○	○	○	HP-101
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	KY-464 KY-569
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	KY-465 KY-570
○	○	○	○	○	○	○	○	LED-357
○	○	○	○	○	○	○	○	PTC-101
○ —	○ —	○ or ○*3	○ or ○*3	○ or ○*3	— ○	○ or ○*3	— ○	SWC-40 SW-1106
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	VR-262 VR-300
○	○	○	○	○	○	○	○	CP-350
○	○	○	○	○	○	○	○	CP-351
○	○	○	○	○	○	○	○	CP-371
—	—	○*3	○*3	○*3	○	○*3	○	IF-885
○	○	○	○	○	○	○	○	MB-884

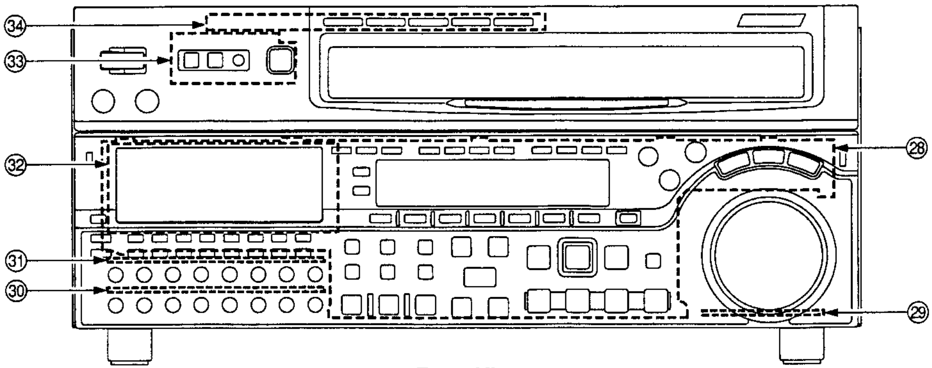
1-8. Location of Main Parts

1-8-1. Printed Circuit Boards and Power Supply Unit Locations

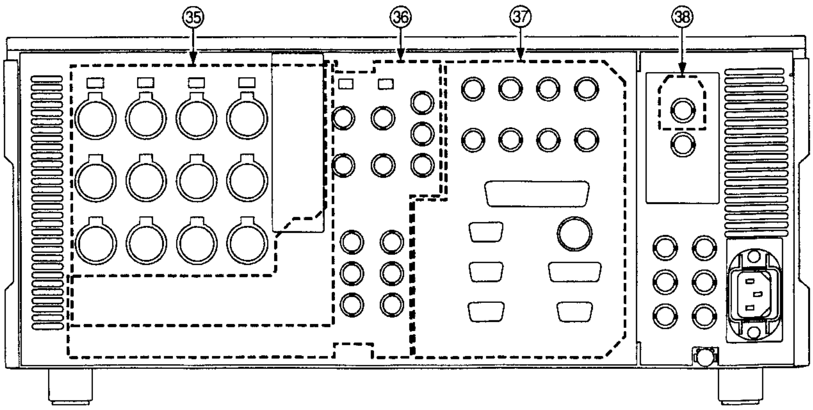
AE-31	⑧
APR-52	⑲
AU-272	⑱
CP-350	㊱
CP-351	㉟
CP-371	㊲
CUE-13	⑯
DIF-134	③
DIO-65	⑪
DM-123	㉑
DPR-155/DPR-229	㉒
DPR-194	④
DPR-195/DPR-208	④
DR-414/DR-508	⑨
DSP-109	②
DT-47	⑦
EPR-1	㉓
EQ-84	⑥
FP-133	⑬
FP-134	⑫
HIF-1	㉖
HP-101	⑩
HPR-1	㉔
IF-885	㊳
IF-886	③
KY-464/KY-569 (MBJ834/MBJ907B)	㉜
KY-465/KY-570 (AC013AA/AC027A)	㉘
LED-357	㉞
MB-884	⑰
PTC-101	㉙
RC-89	⑤
RX-80	㉕
SDI-52	①
SDI-63	㉕
SS-89	⑳
SWC-40	㉝
SW-1106	㉝
TC-104	⑮
TX-96	㉕
VN-13	㉖
VPR-64/VPR-91	㉗
VR-262/VR-300 (AC014AA/1P50A973)	㉚, ㉛
Power supply unit	⑭



< Top View >

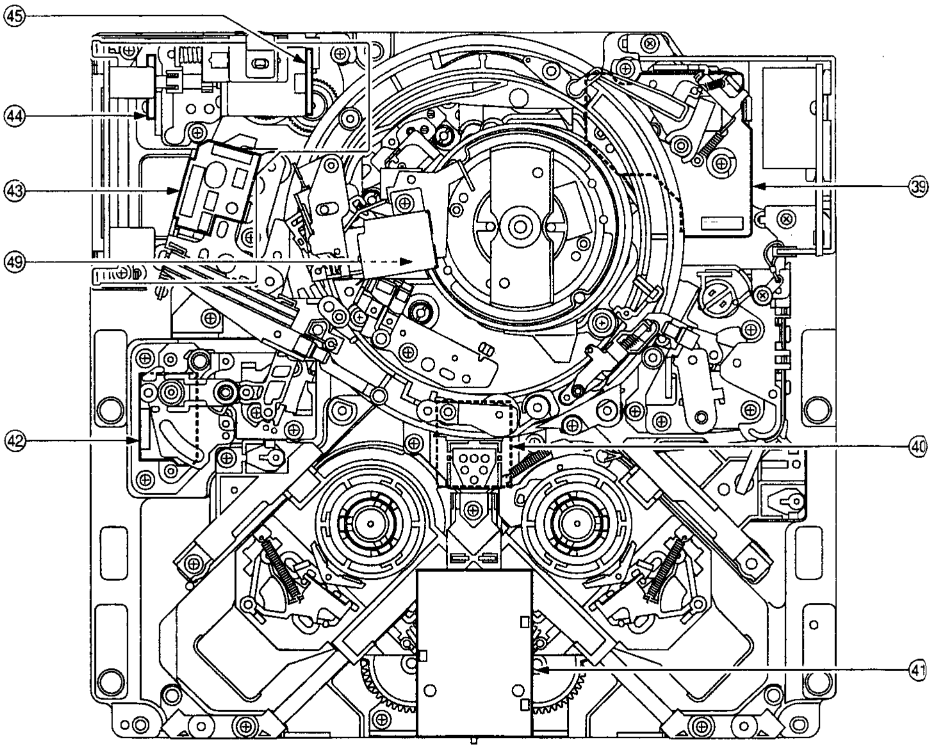


< Front View >

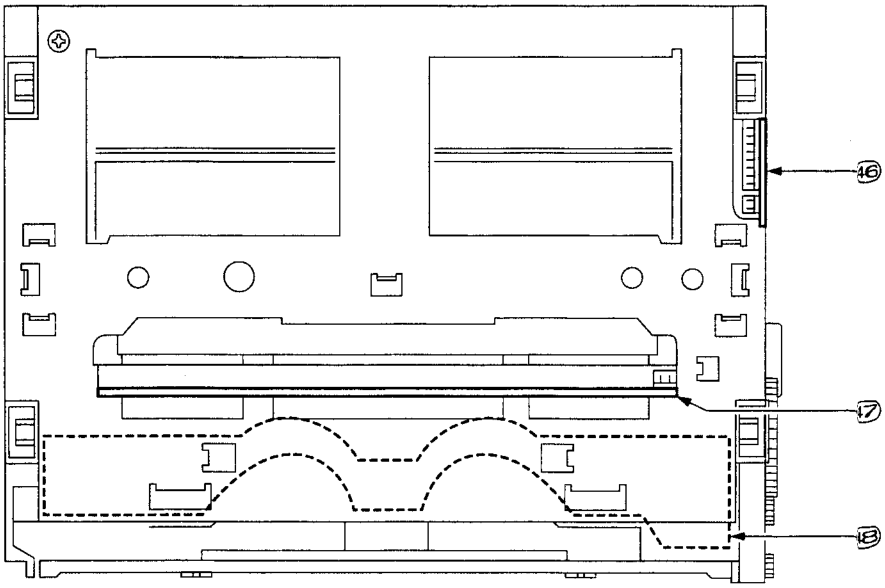


< Rear View >

CCM-15	㊺
CL-29	㊻
DU-107	㊾
HN-268	㊸
LP-81	㊼
PC-70	㊽
PTC-102	㊹
PTC-99	㊵
SE-606/606A	㊶
TR-119	㊷
TR-120	㊴

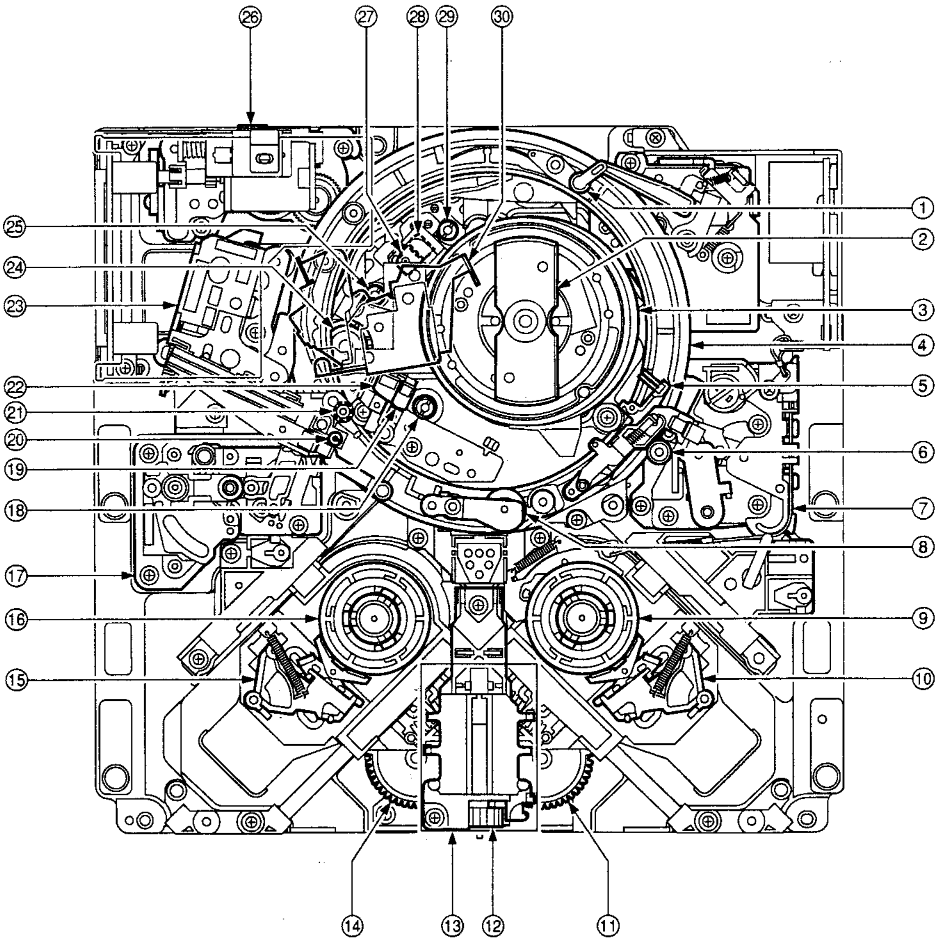


< Top View of Mechanical Deck >



< Top View of Cassette Compartment >

1-8-2. Main Mechanical Part Locations

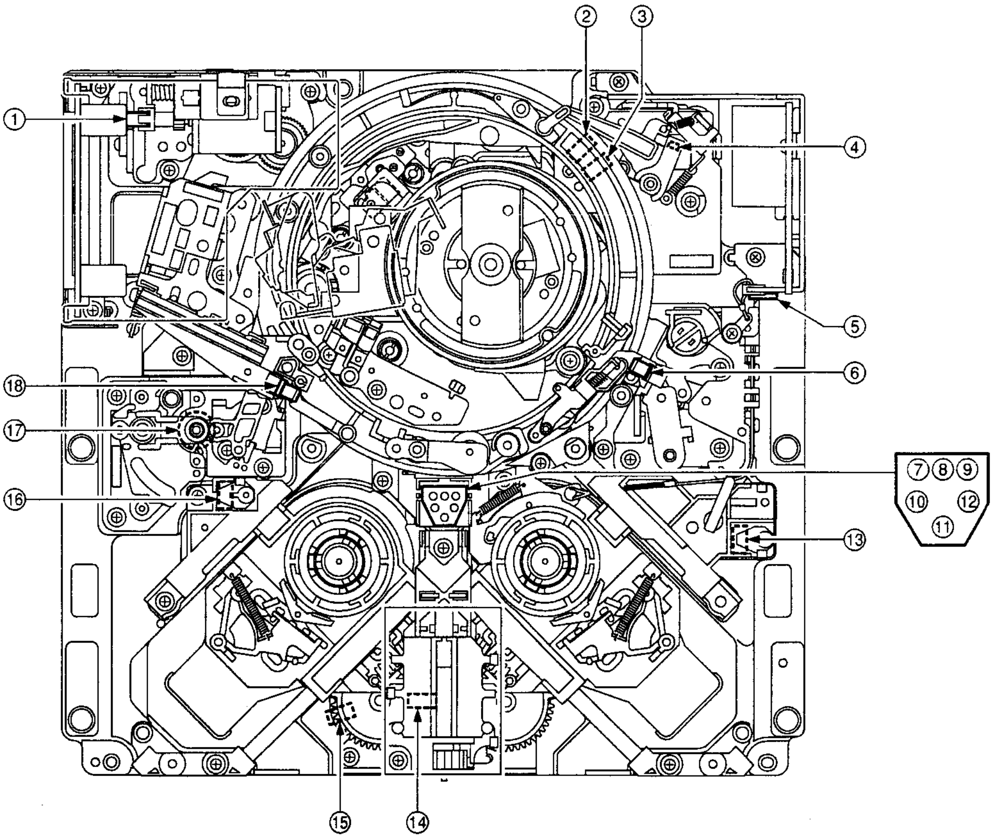


< Top View of Mechanical Deck >

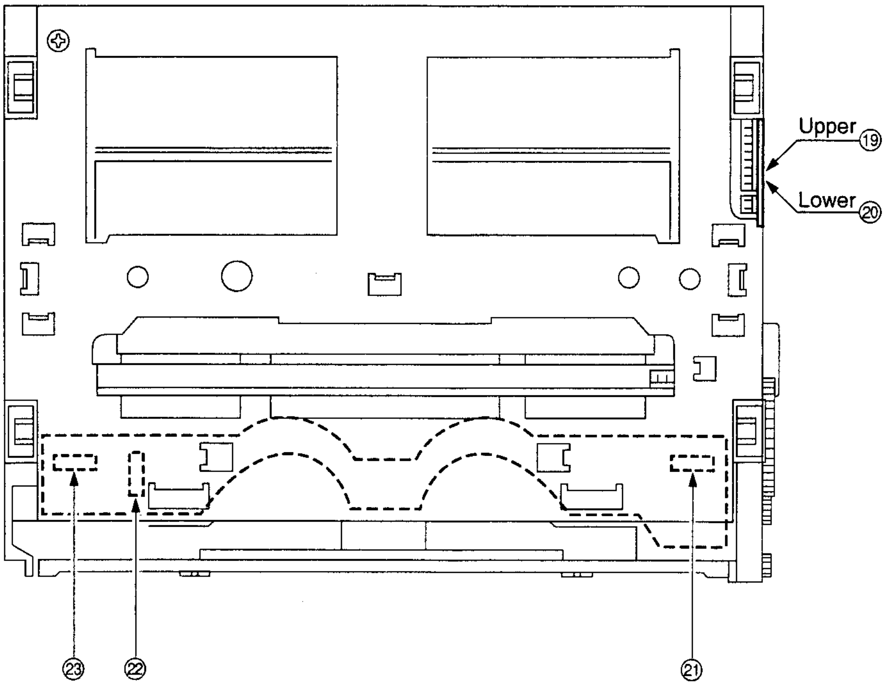
INDEX

① T tension regulator assembly
② Brush slipring assembly
③ Head drum
④ Threading ring
⑤ Audio/TC head cleaner
⑥ TG-10 tape guide
⑦ T drawer arm assembly
⑧ Pinch roller assembly
⑨ T reel table
⑩ T brake assembly
⑪ T drive gear
⑫ Worm assembly
⑬ Motor holder assembly
⑭ S drive gear
⑮ S brake assembly
⑯ S reel table
⑰ S tension regulator assembly
⑱ TG-2 tape guide
⑲ CTL head
⑳ Tape cleaner
㉑ TG-0 tape guide
㉒ Full-erase head (Recorder only)
㉓ Pinch press assembly
㉔ Capstan motor
㉕ TG-4 tape guide
㉖ Gear box assembly
㉗ Audio/TC head
㉘ Audio/TC erase head
㉙ TG-3 tape guide
㉚ W cleaner assembly

1-9. Function and Location of Sensors


①
②
③
④
⑤
⑥
⑦⑧⑨
⑩ ⑫
⑪
⑬
⑭
⑮
⑯
⑰
⑱

< Top View of Mechanical Deck >


Upper ⑲
Lower ⑳
㉓
㉒
㉑

< Top View of Cassette Compartment >

① Threading motor FG sensor

This sensor detects the rotation speed of the threading motor. The output signal of this sensor enters the threading motor servo circuit, and controls the threading/unthreading speed to protect the tape during threading and unthreading operation.

② Unthreading-end sensor
③ Threading-end sensor

These sensors detect whether the threading ring reaches the threading-end or unthreading-end position.

④ T tension regulator arm sensor

This sensor detects the position of a T tension regulator arm. During recording and playback, the output signal of this sensor enters the T reel motor servo circuit, and controls the reel torque to keep a constant T tape tension.

⑤ Condensation sensor

This sensor detects whether the dew condensation occurs in the unit.

⑥ Tape top sensor

This sensor detects the beginning of the tape, and in addition detects the end of the tape that runs in the reverse direction.

⑦ Reel hub diameter sensor

This sensor detects the reel hub diameter detection tab of a cassette.
The reel hub with two types of diameters (thin and thick) is available according to the length of a tape stored in a cassette. This sensor is used to discriminate the diameter. The output signal of this sensor enters the servo circuit of take-up and supply reel motors, and controls the reel rotation speed and torque during tape transport.

⑧ Metal/oxide tape sensor

This sensor detects the metal tape detection tab of a Betacam/Betacam SP cassette.
This sensor is used to discriminate whether the tape stored in a Betacam/Betacam SP cassette is an oxide tape or metal particle tape.

⑨ Tape thickness sensor

This sensor detects the tape thickness detection tab of a cassette.
This sensor is used to discriminate the thickness of the tape stored in a cassette.

⑩⑪⑫ Cassette classification sensors

These sensors detect the three cassette type detection tabs of a cassette.
These sensors are used to discriminate whether a cassette can be used in this unit.

⑬ L cassette REC inhibit sensor

This sensor (switch) detects the condition of a REC inhibit plug for the MPEG IMX/Betacam SX large cassette.

⑭ Reel S position sensor
⑮ Reel L position sensor

These sensors detect whether the reel table moves to the correct position according to the size of the inserted cassette.

⑯ S cassette REC inhibit sensor

This sensor (switch) detects the condition of a REC inhibit plug for the small cassette.

⑰ S tension regulator arm sensor

This sensor detects the position of an S tension regulator arm. During recording and playback, the output signal of this sensor enters the S reel motor servo circuit, and controls the reel torque to keep a constant S tape tension.

⑱ Tape end sensor

This sensor detects the end of the tape that runs in the forward direction.

⑲ Cassette-down (2) sensor
⑳ Cassette-down (1) sensor

These sensors detect the movement (position) of a cassette compartment by the combination of the detection state of the two sensors and a cassette-in sensor.

㉑ Cassette-in sensor (R)

This sensor detects whether a cassette is being inserted.

㉒ Cassette size sensor

This sensor detects whether the inserted cassette is L size or S size.

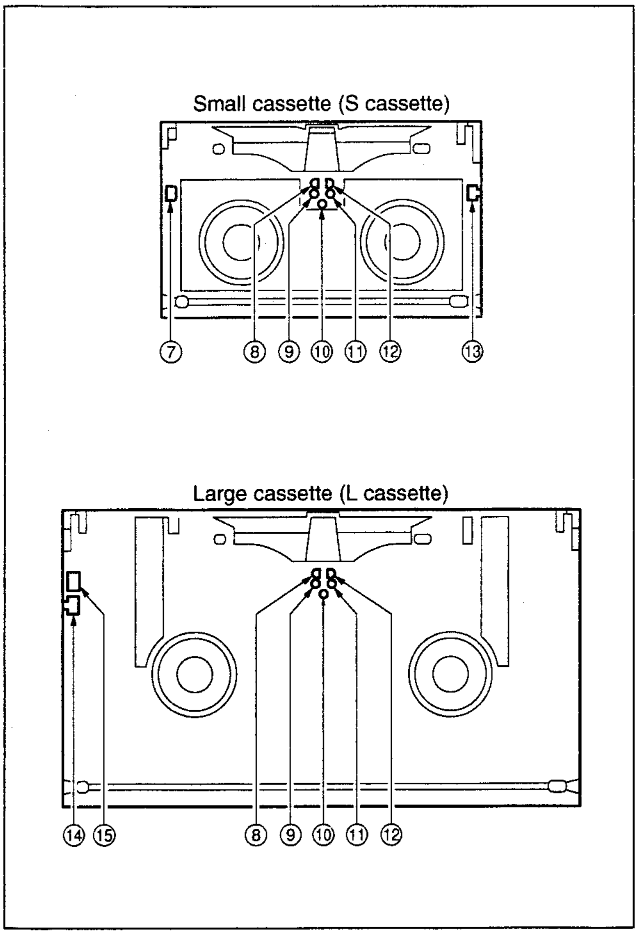
㉓ Cassette-in sensor (L)

This sensor detects whether a cassette is being inserted.

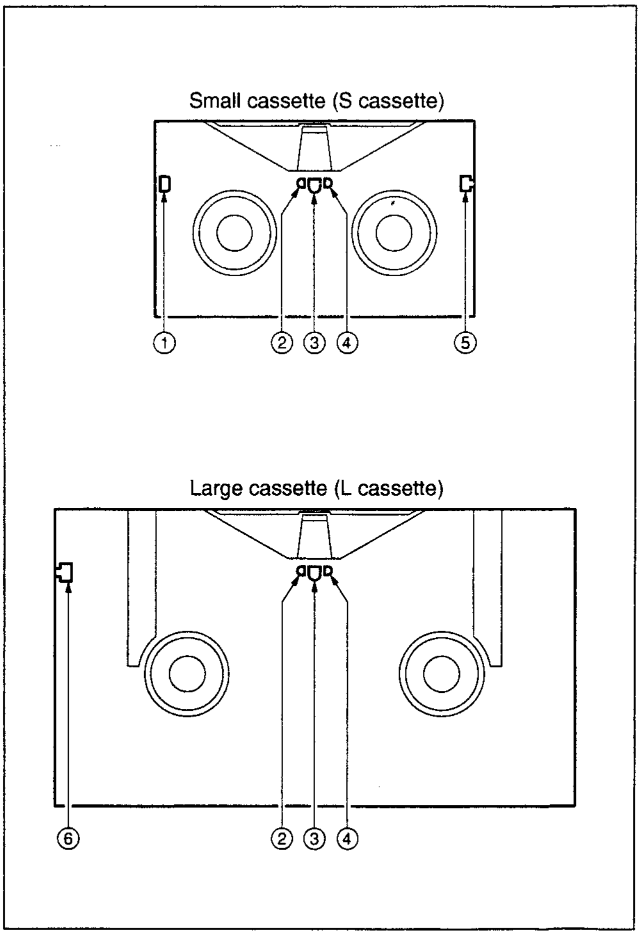
1-10. System of Cassettes

As shown in the figure below, plugs and tabs are provided at the back side of the cassette tape.

Cassette for HDCAM, Digital Betacam, MPEG IMX, and Betacam SX



Cassette for Betacam/Betacam SP

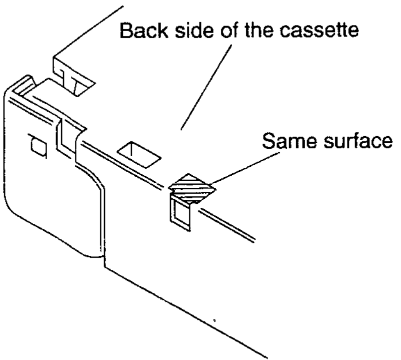


No.	Usage
⑦	S cassette analog REC inhibit hole
⑧	Tape thickness detection tab: Always closed.*1
⑨ ⑩ ⑪	Cassette classification detection tabs (See next page) Cassette classification detection tabs (See next page) Cassette classification detection tabs (See next page)
⑫	Reel hub diameter detection tab With tab (close hole): Small hub Without tab (open hole): Large hub (Cleaning tape etc.)
⑬	S cassette digital REC inhibit tab
⑭	L cassette digital REC inhibit tab
⑮	L cassette analog REC inhibit hole

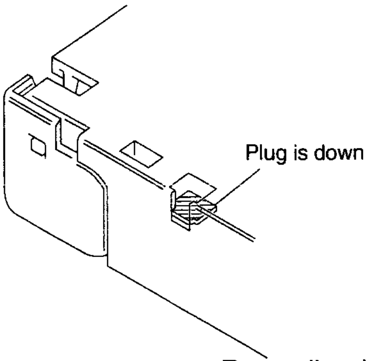
*1 : Currently, there is only one tape thickness of the cassette for HDCAM, Digital Betacam, MPEG IMX, and Betacam SX respectively.

No.	Usage
①	S cassette REC inhibit tab (for oxide tape)
②	Tape thickness detection tab With tab (close hole): Thick (Tape thickness is 20 µm) Without tab (open hole): Thin (Tape thickness is 15 µm)
③	Metal tape detection tab With tab (close hole): Oxide tape Without tab (open hole): Metal particle tape
④	Reel hub diameter detection tab With tab (close hole): Small hub Without tab (open hole): Large hub
⑤	S cassette REC inhibit plug (for metal particle tape)
⑥	L cassette REC inhibit plug

REC Inhibit Plugs



Recording possible



Recording impossible

Cassette classification detection tabs
○: with tab (close hole), ●: without tab (open hole)

Represents the cassette classification by combination of three tabs.

State of Tabs $\underset{⑩}{⑨⑪}$	**Cassette Class**	**Remark**
$\underset{\circ}{\circ\circ}$	Betacam or Betacam SP	
$\underset{\circ}{\bullet\circ}$	Betacam SX	
$\underset{\bullet}{\circ\circ}$	Digital Betacam	
$\underset{\circ}{\circ\bullet}$	HDCAM	
$\underset{\circ}{\bullet\bullet}$	MPEG IMX	
$\underset{\bullet}{\bullet\circ}$, $\underset{\bullet}{\circ\bullet}$, $\underset{\bullet}{\bullet\bullet}$,	Except the above class	Unusable

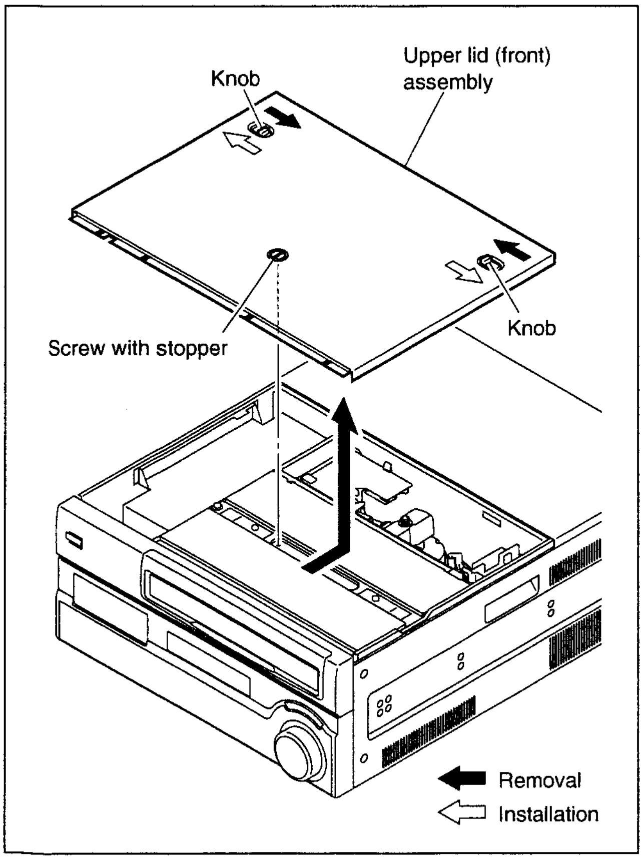
1-11. Taking Out the Cassette in Tape Slacking

When slacking the tape in this unit, follow the steps below to take out the cassette tape.

Note

Being careful not to damage the tape, take out the cassette tape with care.

1. Turn off the power.
2. Fully loosen the fixing screw.
3. Slide the knobs on upper lid (front) assembly each in the inside. (Move the knobs to the outside to fix the upper lid (front) assembly.
4. Remove the upper lid (front) assembly.


Knob
Upper lid (front) assembly
Screw with stopper
Knob
Removal
Installation

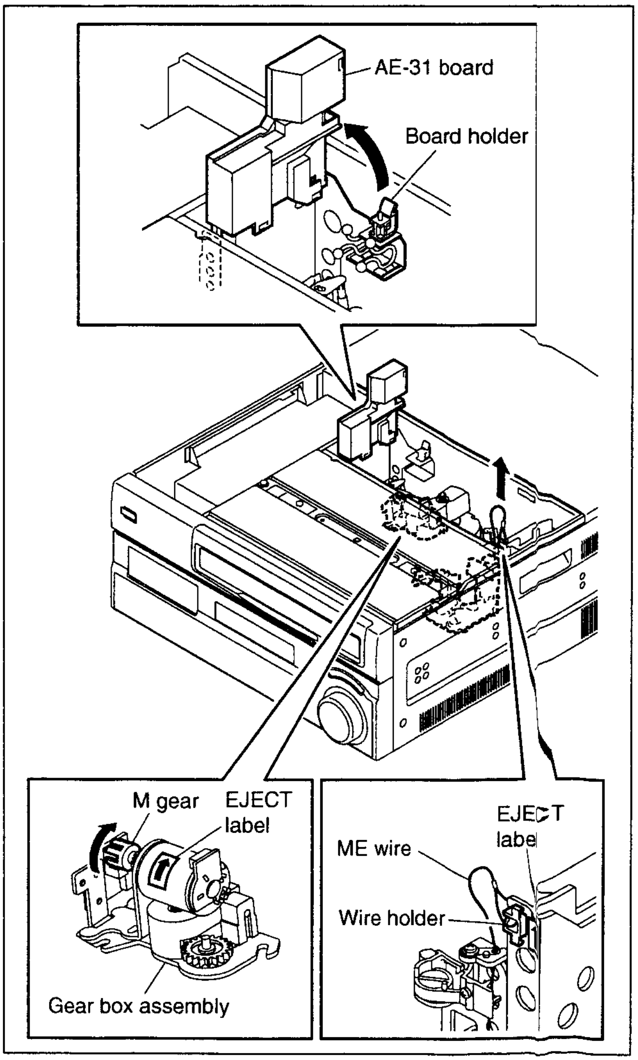
5. Release the lock of the board holder and open the AE-31 board in the arrow direction. (The AE-31 board is not used in MSW-2000.)
6. Check by eye that the unit is in the state to be able to wind manually the tape.
7. Pull the ME wire for a few times with short steps to take up the tape inside the cassette.

   Notes

   - Be careful for the tape not to catch in parts such as a flange of a tape guide.
   - Do not take the ME wire off the wire holder.
   - The ME wire links with the T real table.

     The T real table rotates about 1/24 turns clockwise (take-up direction) by pulling the ME wire about 6 mm.

8. Rotate the M gear of the threading motor block in direction of arrow shown in the EJECT label by about a half turn to slack off the tape.
9. Pull the ME wire for a few times with short steps in the direction of the arrow shown in the EJECT label to take up the tape inside the cassette.

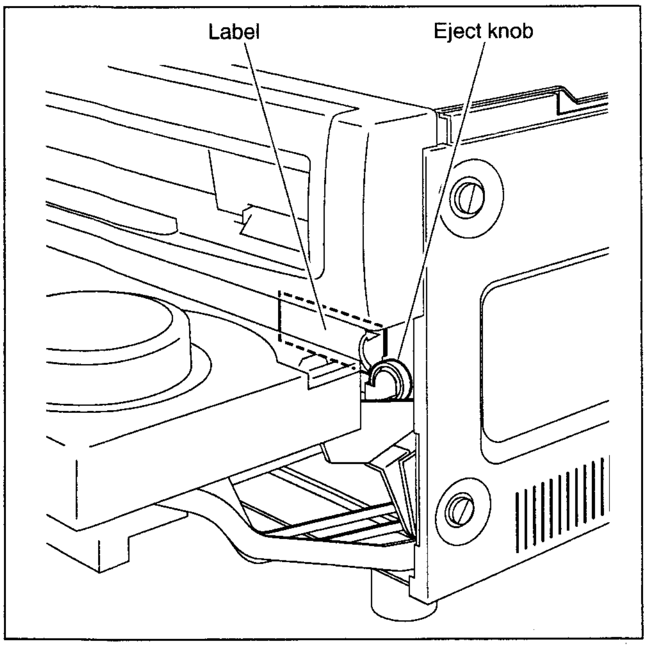

AE-31 board
Board holder
M gear
EJECT label
Gear box assembly
ME wire
EJECT label
Wire holder

10. To wind up the tape into the cassette, repeat steps 8 and 9.

Note

On completely winding up the tape into the cassette, the M gear will be tighten.
(Unthreading end state)

11. Check that the ME wire is slacken.
12. Open the lower control panel.
13. Turn the eject knob in the direction of the arrow shown in the label until the cassette is completely ejected.

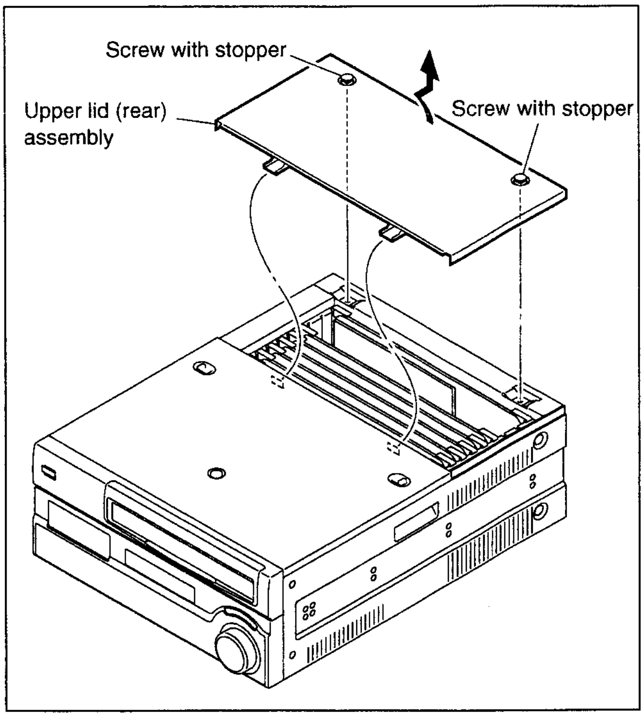

Label
Eject knob

1-12. Removing/Reattaching Plug-in Board

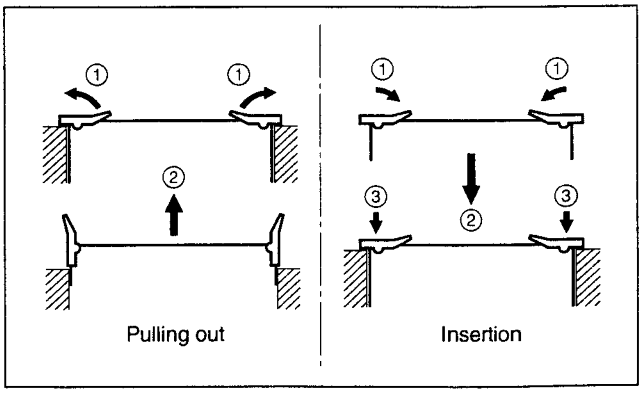
Notes

- Turn off the power and unplug the power cord before removing/reattaching the board.
- When the plug-in board is replaced, refer to the Section 1-25.

1. Fully loosen the two fixing screws.
2. Remove the upper lid (rear) assembly by moving in the direction indicated by the arrow.


Screw with stopper
Upper lid (rear) assembly
Screw with stopper

3. Open the eject levers on both ends of the board in the direction of the arrows.
4. Hold the eject levers and slowly pull the board out.


①
①
②
Pulling out
①
①
③
②
③
Insertion

Note

The AU-272 and EQ-84 boards should be removed together due to their structural feature.

5. When removing the ① EQ-84 board, ⑥ EPR-1 board, ⑧ HIF-1 board or ⑨ VPR-64/91 board, disconnect the harnesses or cables from its board.

① EQ-84 board:
CN101 (G-3) .... 6P White (Orange and Red)
CN200 (E-4) (Recorder only)
.... 6P White (Yellow and Blue)
CN600 (A-3) .... 3P White (Red)
CN700 (E-3) .... 3P White (Yellow)
CN1600(A-4) .... 3P White (Orange)
CN1700(E-4) .... 3P White (Blue)

⑥ EPR-1 board (MSW series only):
(Cable color : White)
* CN500 (K-1) (Recorder only) .... 1P (Black)
* CN600 (M-1) .... 1P (White)
* CN601 (L-1) .... 1P (Brown)

⑧ HIF-1 board (HDW series only):
(1) Board (suffix -22 or higher)
(Cable color : Black)
*1 CN200 (B-3/RX-80) (Recoder only) 1P (1)
*1 CN202 (A-3/RX-80) (Recoder only) 1P (2)
*1 CN203 (A-3/TX-96 (1)*2) .... 1P (B)
*1 CN204 (B-3/TX-96 (1)*2) .... 1P (A)
*1 CN203 (A-3/TX-96 (2)*2) .... 1P (C)

*1: The HIF-1 board piggybacks the TX-96 and RX-80 boards, therefore, those connectors are mounted on the TX-96 or RX-80 board (in the shield case).
*2: The two TX-96 boards are in the unit.

(2) Board (suffix -21)
(Cable color : Black)
*3 CN1 (B-1/SDI-63) (Recorder only) 1P (1)
*3 CN2 (A-1/SDI-63) (Recorder only) 1P (2)
*3 CN200 (E-1/SDI-63) .... 1P (B)
*3 CN201 (D-1/SDI-63) .... 1P (A)
*3 CN301 (F-1/SDI-63) .... 1P (C)

*3: The HIF-1 board piggybacks the SDI-63 board, therefore, those connectors are mounted on the SDI-63 board (in the shield case).

⑨ VPR-64/VPR-91 board: (Cable color : White)
*4 CN100 (E-1/SDI-52) (Recorder only) .. 1P (Red)
*4 CN101 (F-1/SDI-52) (Recorder only)... 1P (Yellow)
*4 CN500 (H-1/SDI-52) .... 1P (Orange)
*4 CN501 (F-1/SDI-52) .... 1P (Green)
*4 CN600 (H-1/SDI-52) .... 1P (Blue)

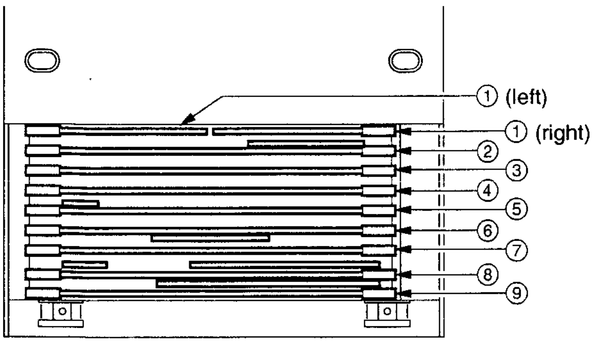
*4: The VPR-64/VPR-91 board piggybacks the SDI-52 board, therefore those connectors are mounted on the SDI-52 board.

When reattaching the board, install in the reverse order of removal.

Notes

- When inserting the EQ-84 board, do not allow the harness to contact the switch S1100 at the upper right of the board.
- After inserting the board, push in the two folded eject levers simultaneously to firmly connect the plug-in board to the connector on the motherboard.
- When reattaching the upper lid (rear) assembly, be sure to insert the protrusions in the square holes on the chassis, and then secure the lid.

Location of Plug-in Boards



(Rear side)

No.	Main board	Piggybacked board	HDW-					DVW-		MSW-			
			2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P M2100 M2100P	M2000E M2000EP M2100E M2100EP
① (left)	EQ-84		○	○	○	○	○	○	○	○	○	○	○
① (right)	AU-272		—	—	○	○	○	—	○	—	○	○	○
②	APR-52	RC-89	○	○	○	○	○	—	—	—	—	—	—
	APR-52		—	—	—	—	—	○	○	○	○	○	○
③	SS-89		○	○	○	○	○	○	○	○	○	○	○
④	DM-123		—	—	○	○	○	—	○	—	○	○	○
⑤	DPR-155	DPR-195	○	—	○	—	○	—	—	—	—	—	—
	DPR-155	DPR-194	—	—	—	—	—	—	—	○	—	—	—
	DPR-155	DPR-208	—	—	—	—	—	—	—	—	○	○	—
			↓		↓		↓			↓	↓	↓	
	DPR-229		○	○	○	○	○	○	○	○	○	○	○
⑥	EPR-1	IF-886 *3	—	—	—	—	—	○	○	○	○	○	○
⑦	HPR-1	DIF-134 *1	○	○	○	○	○	—	—	—	—	—	—
⑧	HIF-1	SDI-63	○	—	○	—	○	—	—	○ *2	○ *2	○ *2	○ *2
	HIF-1	RX-80 & TX-96	○	○	○	○	↓	—	—	↓	↓	↓	↓
	HIF-1	TX-96	—	—	—	—	○	○ *2	○ *2	○ *2	○ *2	○ *2	○ *2
	VN-13	DSP-109 *4	—	—	—	—	—	—	—	○ *3	○ *3	○ *3	○
⑨	VPR-64	SDI-52	○	○	○	○	○	—	—	○	○	○	○
	VPR-91	SDI-52	—	—	—	—	—	○	○	—	—	—	—

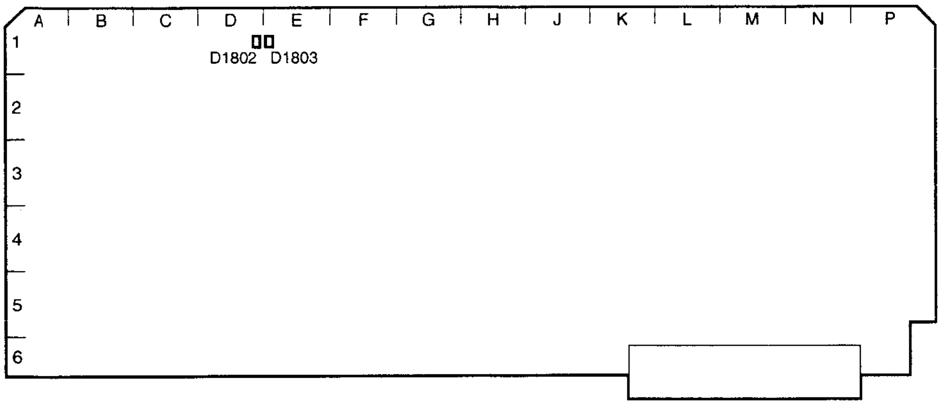
*1: Option HKDW-102
*2: Option BKMW-104
*3: Option BKMW-E2000/E3000
*4: Option BKMW-E3000
↓: Changed

1-13. Function of LEDs on Circuit Boards

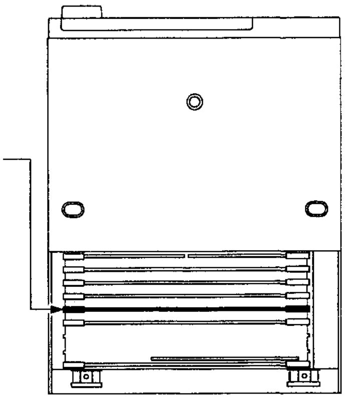
DM-123 Board

Note

Refer to Section 5-1-1 for models in which this board is used.



DM-123 Board (Side A)



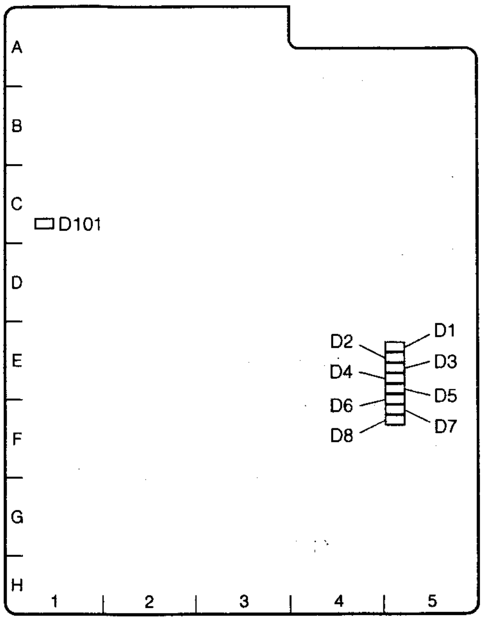
< Top View >

LED No.	Name	Color	Description	Normal state
D1802	STS	Green	Blinks when the MPU (IC908/DM-123 board) is communicating.	Blinks
D1803	MAINTE	Green	Lights when either bit-5 or bit-6 of S1801 is turned ON or both bits are turned ON.	OFF

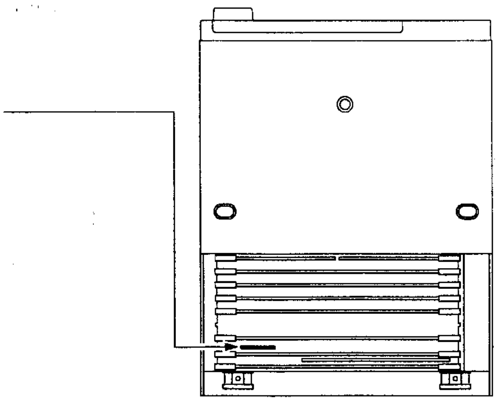
DSP-109 Board

Note

Refer to Section 5-1-1 for models in which this board is used.



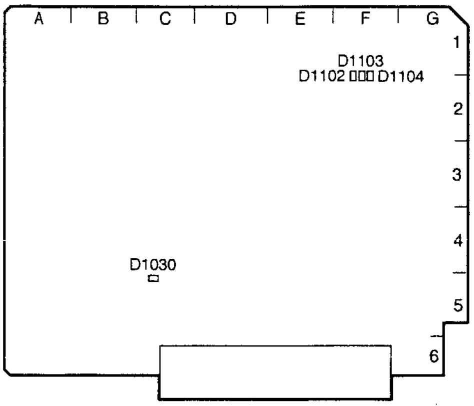
DSP-109 Board (Side A)



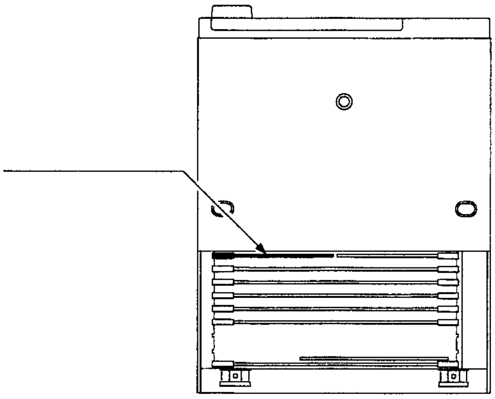
< Top View >

LED No.	Name	Color	Description	Normal state
D1	—	Yellow	Lights while data is transmitted to Proxy AV file.	—
D2	—	Green	Lights when the DSP (IC2/DSP-109 board) is not operating normally.	OFF
D3	—	Red	Blinks while data is transmitted to Proxy AV file.	—
D4	—	Green	Blinks when the FPGA (IC1/DSP-109 board) is operating normally.	Blinks
D5	—	Yellow	Factory use	—
D6	—	Green	Factory use	—
D7	—	Red	Factory use	—
D8	—	Green	Factory use	—
D101	—	Green	Factory use	OFF

EQ-84 Board



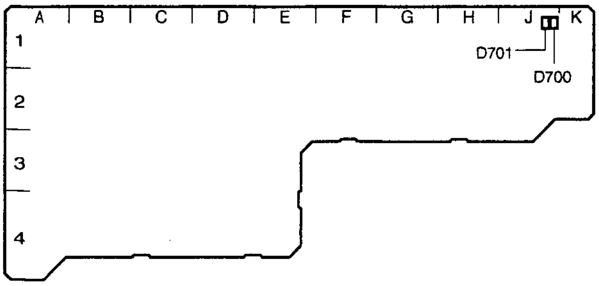
EQ-84 Board (Side A)



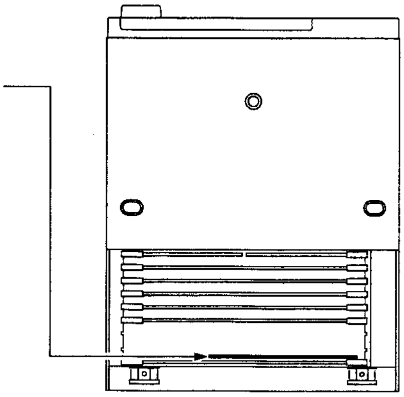
< Top View >

LED No.	Name	Color	Description	Normal state
D1030	NO SIGNAL	Green	Off when the playback data is not normal.	ON
D1102	REC MODE	Green	Lights during the REC mode.	Record mode : ON Others : OFF
D1103	ANALOG MODE	Green	Lights during the Analog Betacam playback mode.	Analog Betacam PB mode : ON Others : OFF
D1104	CPU	Green	Blinks when the MPU (IC1113/EQ-84 board) is communicating.	Blinks

SDI-52 Board



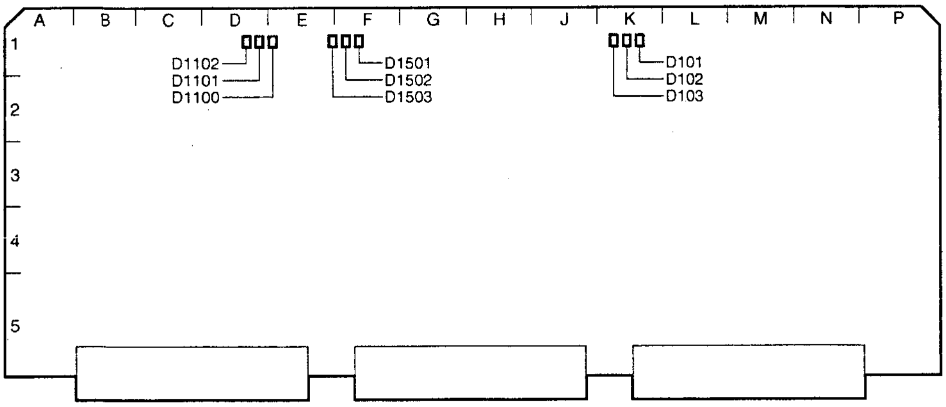
SDI-52 Board (Side A)



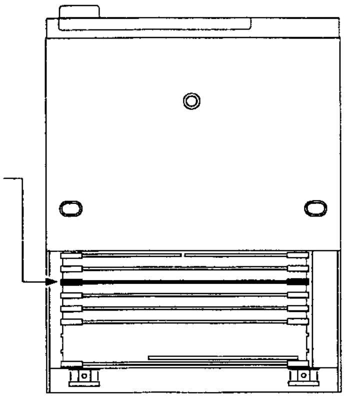
< Top View >

LED No.	Name	Color	Description	Normal state
D700	SDI TRS	Green	Lights when the SDI INPUT connector can receive the SDI format signal normally.	ON
D701	VCO ADJ	Green	Lights when electronic volume (EVR) data comes near the proper value during VCO free-running adjustment in the maintenance mode.	OFF

SS-89 Board



SS-89 Board (Side A)



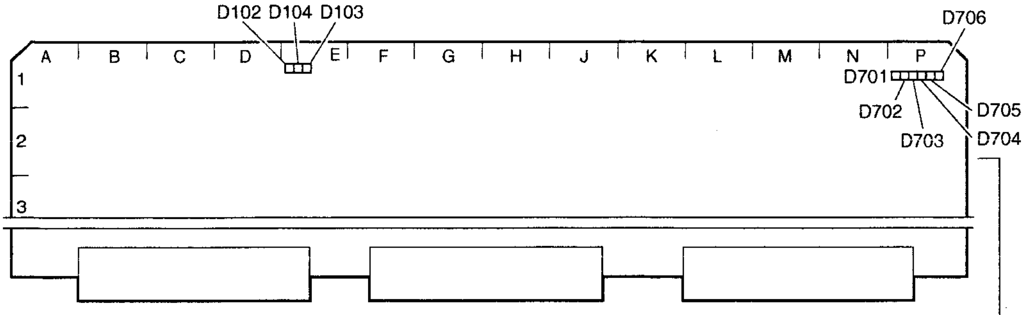
< Top View >

LED No.	Name	Color	Description	Normal state
D101	ERR	Red	Lights when servo errors have occurred. Blinks when downloading the servo software.	OFF
D102	CPU	Green	Blinks when the servo CPU is operating normally.	Blinks
D103	LOG	Green	Lights when updating the servo log. Off when stopping.	ON
D1100	ERR	Red	Lights when the SYS CPU is not operating normally.	OFF
D1101	CPU	Green	Blinks when the SYS CPU is operating normally.	Blinks
D1102	LOG	Green	Lights when the SYS CPU log has been updated. Off when stopping.	ON
D1501	SYS STS1	Green	Lights when the communication between the SYS CPU and KY CPU is normal. Off when the communication between the SYS CPU and KY CPU is abnormal.	ON
D1502	SYS STS2	Green	Lights when the communication between the SYS CPU and SV CPU is normal. Off when the communication between the SYS CPU and SV CPU is abnormal.	ON
D1503	MAINTE	Green	Lights while executing the maintenance mode.	OFF

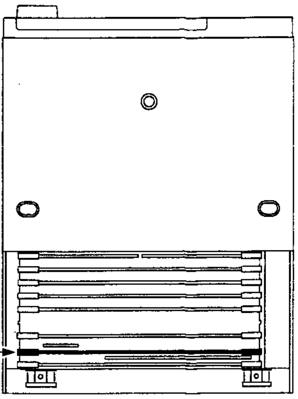
VN-13 Board

Note

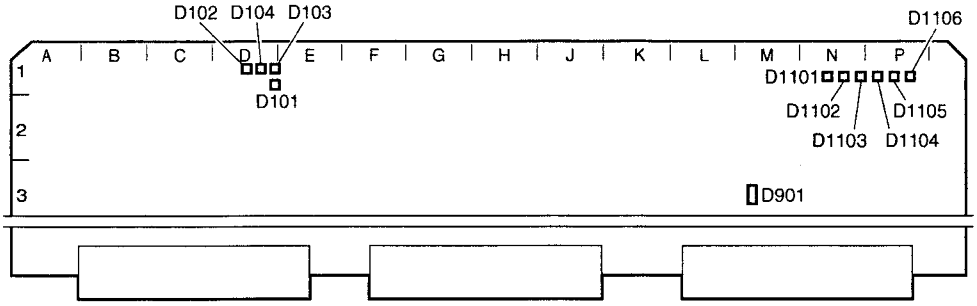
Refer to Section 5-1-1 for models in which this board is used.


D102 D104 D103
D706
A B C D E F G H J K L M N P
1
2
3
D701
D702
D703
D705
D704

VN-13 Board (Suffix -12 and higher, Side A)



< Top View >


D102 D104 D103
D1106
A B C D E F G H J K L M N P
1
2
3
D101
D1101
D1102
D1103
D1104
D1105
D901

VN-13 Board (Suffix -11, Side A)

LED No.	Name	Color	Description	Normal state
D101 *1	—	Green	Factory use	OFF
D102	CPU	Green	Blinks when the CPU is operating.	Blinks
D103	LOG	Green	Factory use	—
D104	ERR	Red	Lights when an error is detected.	OFF
D701 *2	TX	Green	Lights while data is transmitted to network.	—
D702 *2	RX	Green	Lights while data is received from network.	—
D703 *2	FDX	Green	Duplex status Lights in full duplex communication. Off in half duplex communication.	—
D704 *2	1000	Green	Lights in 1000BASE-T communication.	—
D705 *2	100	Green	Lights in 100BASE-TX communication.	—
D706 *2	10	Green	Lights in 10BASE-T communication.	—
D901 *1	—	Green	Factory use	OFF
D1101 *1	TX	Green	Lights while data is transmitted to network.	—
D1102 *1	RX	Green	Lights while data is received from network.	—
D1103 *1	FDX	Green	Duplex status Lights in full duplex communication. Off in half duplex communication.	—
D1104 *1	1000	Green	Lights in 1000BASE-T communication.	—
D1105 *1	100	Green	Lights in 100BASE-TX communication.	—
D1106 *1	10	Green	Lights in 10BASE-T communication.	—

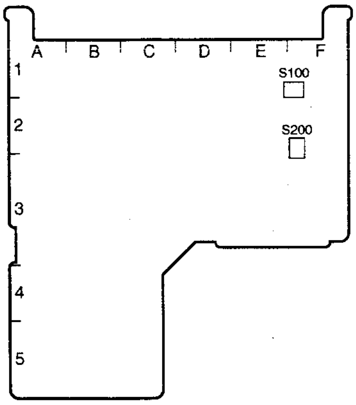
*1: board number suffix -11
*2: board number suffix -12 and higher

1-14. Description of Switch Functions

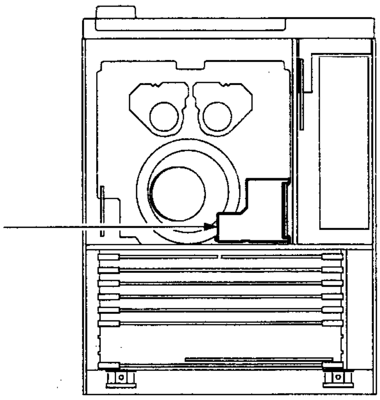
AE-31 Board

Note

Refer to Section 5-1-1 for models in which this board is used.



AE-31 Board (Side A)



< Top View >

HEAD TUNE switches (For Betacam/Betacam SP longitudinal audio playback)

It is not necessary to change the setting of this switch, when installing.

Channel	Ref. No.	Description
CH1	S100	By coupling with RV100, adjust the CH1 head amp high frequency response. This switch is used in audio head dumping adjustment. When the unit is shipped, this switch is set to the position based on the adjustment condition.
CH2	S200	By coupling with RV200, adjust the CH2 head amp high frequency response. This switch is used in audio head dumping adjustment. When the unit is shipped, this switch is set to the position based on the adjustment condition.

APR-52 Board

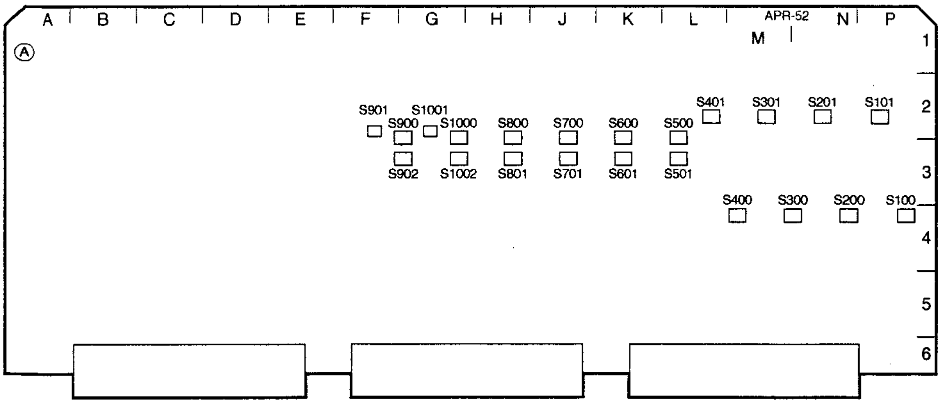
If necessary, perform the following audio-related settings using the switches on the APR-52 board.

- Audio input level *1
- Audio input headroom *2
- Audio output level *1
- Audio output headroom *2
- Monitor output level *1
- Monitor output headroom *2
- Monitor output level, fixed/variable selection

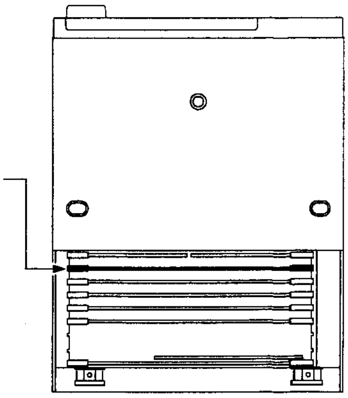
*1: Select the level for each channel from +4, 0, –3, –20 dBm. (Factory settings: +4 dBm for each channel)
*2: Select the headroom for each channel from 20, 18, 16, 12 dB. (Factory settings: 20 dB for each channel)

Note

Refer to Section 1-12 for removing and reattaching the plug-in boards.

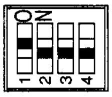
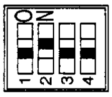
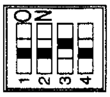
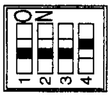

A
B
C
D
E
F
G
H
J
K
L
APR-52
M
N
P
Ⓐ
1
2
3
4
5
6
S901
S1001
S900
S1000
S800
S700
S600
S500
S401
S301
S201
S101
S902
S1002
S801
S701
S601
S501
S400
S300
S200
S100

APR-52 Board (Side A)

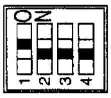
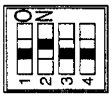
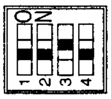
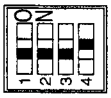


< Top View >

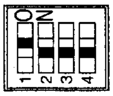
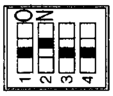
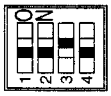
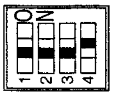
Audio input level settings (Recorder only)

Channel	Ref. No.	Switches state (■ : Knob position)			
CH1	S100				
CH2	S200				
CH3	S300				
CH4	S400	+4 dBm/600 Ω (Factory setting)	0 dBm/600 Ω	–3 dBm/600 Ω	–20 dBm/600 Ω

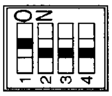
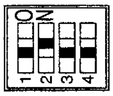
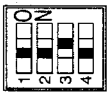
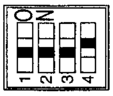
Audio input headroom settings

Channel	Ref. No.	Switches state (■ : Knob position)			
CH1	S101				
CH2	S201				
CH3	S301				
CH4	S401	20 dB (Factory setting)	18 dB	16 dB	12 dB

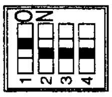
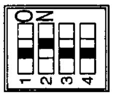
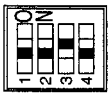
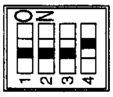
Audio output level settings

Channel	Ref. No.	Switches state (■ : Knob position)			
CH1	S501				
CH2	S601				
CH3	S701				
CH4	S801	+4 dBm/600 Ω (Factory setting)	0 dBm/600 Ω	−3 dBm/600 Ω	−20 dBm/600 Ω

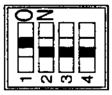
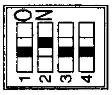
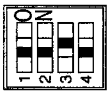
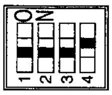
Audio output headroom settings

Channel	Ref. No.	Switches state (■ : Knob position)			
CH1	S500				
CH2	S600				
CH3	S700				
CH4	S800	20 dB (Factory setting)	18 dB	16 dB	12 dB

Monitor output level settings

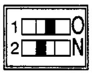
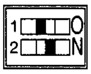
Channel	Ref. No.	Switches state (■ : Knob position)			
L	S902				
R	S1002	+4 dBm/600 Ω (Factory setting)	0 dBm/600 Ω	−3 dBm/600 Ω	−20 dBm/600 Ω

Monitor output headroom settings

Channel	Ref. No.	Switches state (■ : Knob position)			
L	S900				
R	S1000	20 dB (Factory setting)	18 dB	16 dB	12 dB

Monitor output level switching (fixed or variable)

When the variable level is selected, the level is adjusted with the PHONES level control knob.

Channel	Ref. No.	Switch state (■ : Knob position)	
L	S901	Fixed 	Variable 
R	S1001	(Factory setting)	

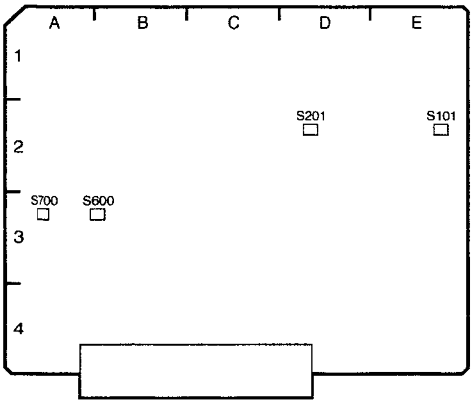
AU-272 Board

If necessary, perform the following audio-related settings using the switches on the AU-272 board.

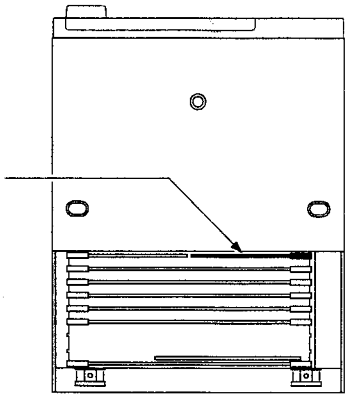
- Analg audio (LAU) output level
- Analog audio (AFM) output gain

Note

Refer to Section 5-1-1 for models in which this board is used.

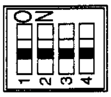
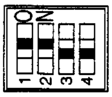


AU-272 Board (Side A)



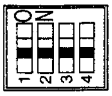
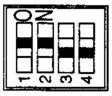
< Top View >

Analog Audio output level settings (For Betacam/Betacam SP longitudinal audio playback)

Channel	Ref. No.	Switches state (■ : Knob position)	
CH1	S101	 0 dBm/600 Ω (Factory setting)	 −3 dBm/600 Ω
CH2	S201		

Analog Audio output gain settings (For Betacam SP AFM playback)

This switch is not mounted in HDW-S2000/P.

Channel	Ref. No.	Switches state (■ : Knob position)	
CH3	S600	 0 dB (Factory setting)	 +3 dB (Set this when +3 dB gain up of the AFM PB level is obtained.)
CH4	S700		

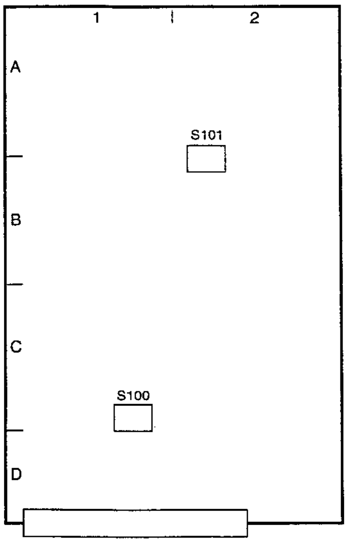
CUE-13 Board

If necessary, perform the following audio-related settings using the switches on the CUE-13 board.

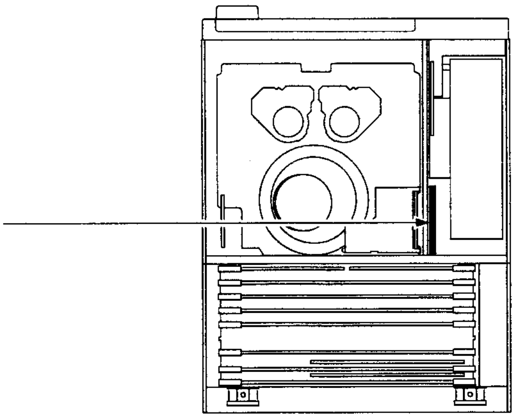
- CUE input level
- CUE output level

Note

Refer to Section 5-1-1 for models in which this board is used.

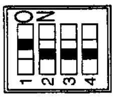
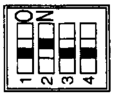
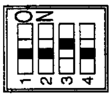
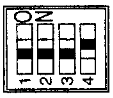


CUE-13 Board (Side A)

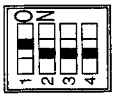
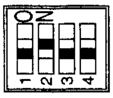
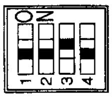
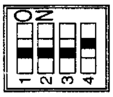


< Top View >

CUE input level settings (HDW-2000, M2000/P, S2000/P, DVW-2000/P, M2000/P only)

Ref. No.	Switches state (■ : Knob position)			
S100	 +4 dBm/600 Ω (Factory setting)	 0 dBm/600 Ω	 −3 dBm/600 Ω	 −20 dBm/600 Ω

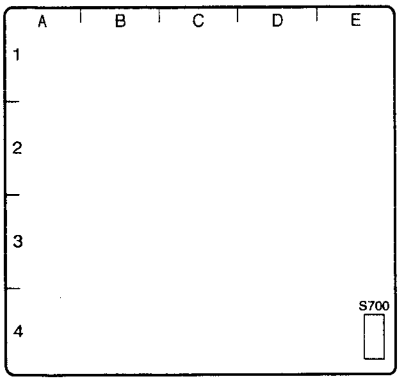
CUE output level settings

Ref. No.	Switches state (■ : Knob position)			
S101	 +4 dBm/600 Ω (Factory setting)	 0 dBm/600 Ω	 −3 dBm/600 Ω	 −20 dBm/600 Ω

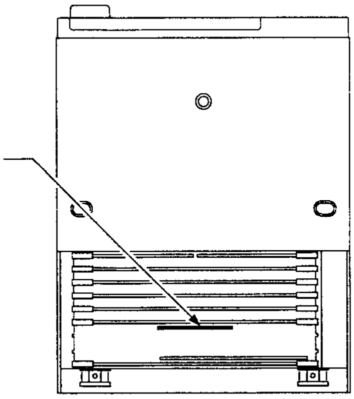
DIF-134 Board (HKDW-102 : Option for HDW series)

Note

Never change the setting of the factory use switches.
Refer to Section 1-12 for removing/reattaching the plug-in board.



DIF-134 Board (Side A)



< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S700	1	CPU I/F SEL0	Select CPU I/F mode (Synchronous I/F mode)	OFF
	2	CPU I/F SEL1	Select CPU I/F mode (Synchronous I/F mode)	OFF
	3	—	Factory use	OFF
	4	EVR_SEL	Setting for Enable of EVR	ON
	5	RX_RESET	Forcibly RX reset	OFF
	6	TX_RESET	Forcibly TX reset	OFF
	7	—	Not used	OFF
	8	—	Not used	OFF

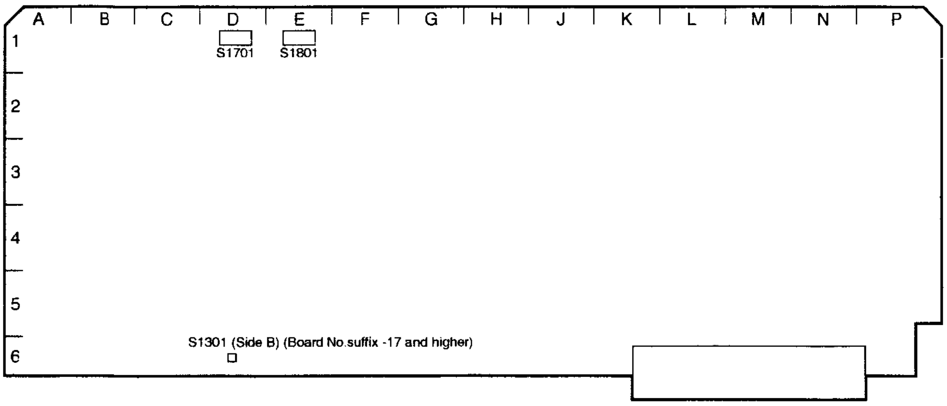
DM-123 Board

Note

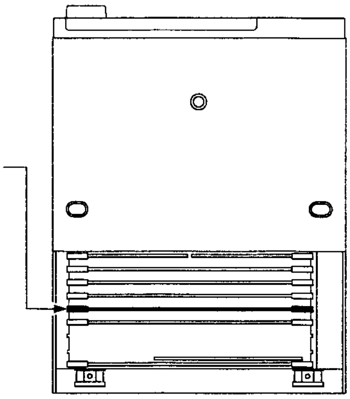
Never change the settings of the factory use switches.

Refer to Section 1-12 for removing/reattaching the plug-in board.

Refer to Section 5-1-1 for models in which this board is used.



DM-123 Board (Side A)



< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S1701	1	Y MUTING	OFF: Normal mode ON: Muting luminance signal	OFF
	2, 3	—	Factory use	OFF
	4	C MUTING	OFF: Normal mode ON: Muting color difference signal	OFF
	5	COMB	Turn ON a comb filter when the color difference signal has significant line crawl which cannot be corrected by LCC. OFF: Comb filter OFF (Normal mode) ON: Comb filter ON	OFF
	6 to 8	—	Factory use	OFF
S1801	1	—	Factory use	OFF
	2	IMP OFF	VCO free running adjustment of DM-123 board selection switch OFF: Normal mode ON: Adjustment mode	OFF
	3	—	Factory use	OFF
	4	—	Factory use	OFF
	5	AGC OFF	Cosine equalizer adjustment of DM-123 board selection switch OFF: Normal mode ON: Adjustment mode	OFF
	6	DO ADJ	Cosine equalizer adjustment of DM-123 board selection switch OFF: Normal mode ON: Adjustment mode	OFF
	7, 8	—	Not used	OFF
S1301 (Board No. suffix -17 and higher)	1	—	Factory use	OFF
	2	—	Factory use	OFF

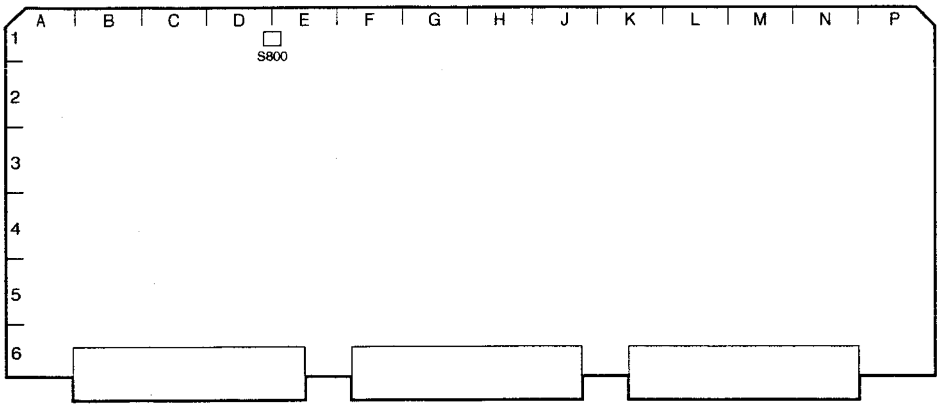
DPR-155 Board

Note

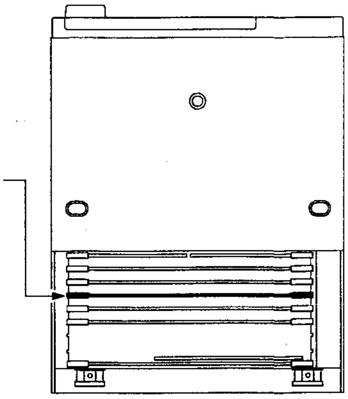
Never change the setting of the factory use switches.

Refer to Section 1-12 for removing/reattaching the plug-in board.

Refer to Section 5-1-1 for models in which this board is used.



DPR-155 Board (Side A)



< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S800	1 to 4	—	Factory use	OFF

Note

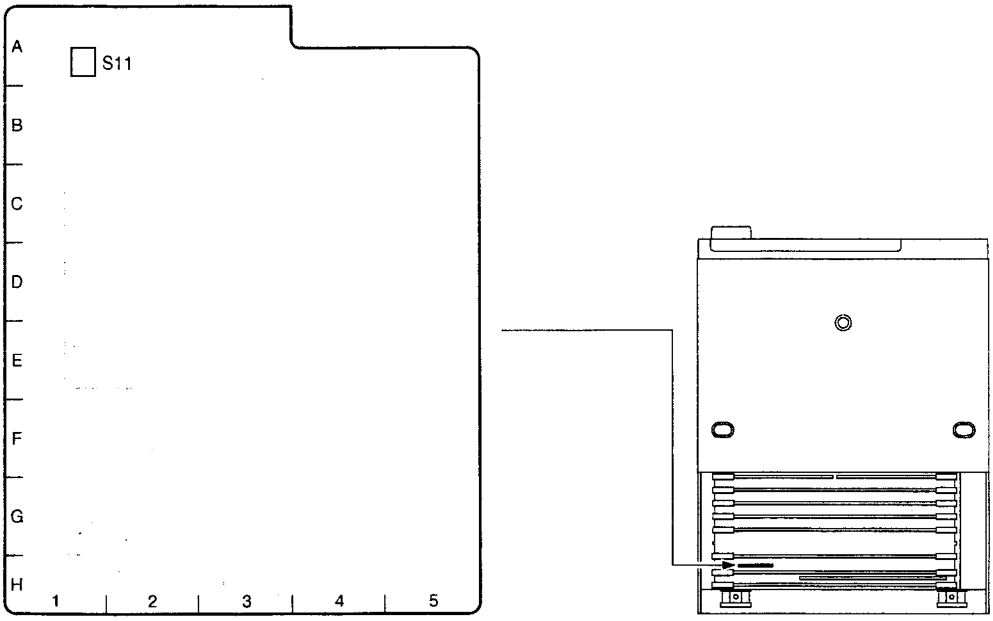
No switch is used in the DPR-229 board.

DSP-109 Board

Note

Never change the setting of the factory use switches.

Refer to Section 5-1-1 for models in which this board is used.



DSP-109 Board (Side A)

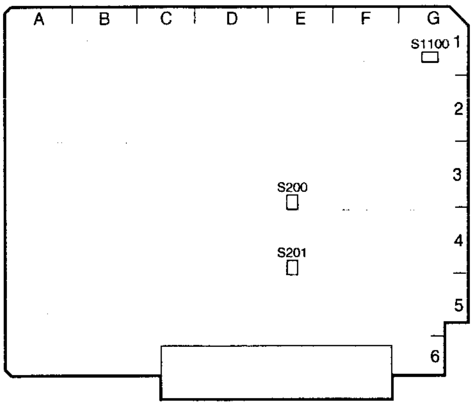
< Top View >

Ref No.	Bit	Name	Description	Factory setting
S11	1	—	Factory use	OFF
	2	—	Factory use	ON

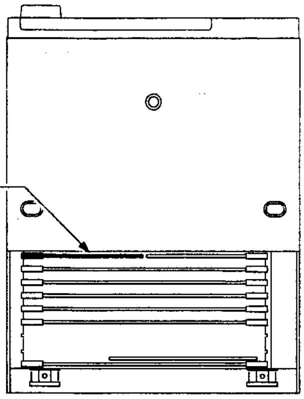
EQ-84 Board

Note

Never change the settings of the factory use switches.
Refer to Section 1-12 for removing/reattaching the plug-in board.



EQ-84 Board (Side A)



< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S200	1, 2	—	Factory use	OFF
S201	1, 2	—	Factory use	OFF
S1100	—	MAINTE	Default setting of EQ adjustment regardless of format	OFF

Note

When inserting the EQ-84 board, do not allow the harness to contact the switch S1100 at the upper right of the board.
If the unit is turned on with the switch S1100 is being pressed by the harness, the adjusted value of the EQ-84 board is initialized. Therefore, data are not correctly recorded and played back.
In this case, turn off the unit and route the harness properly. After turning on the unit again, the unit operates with the adjusted value.

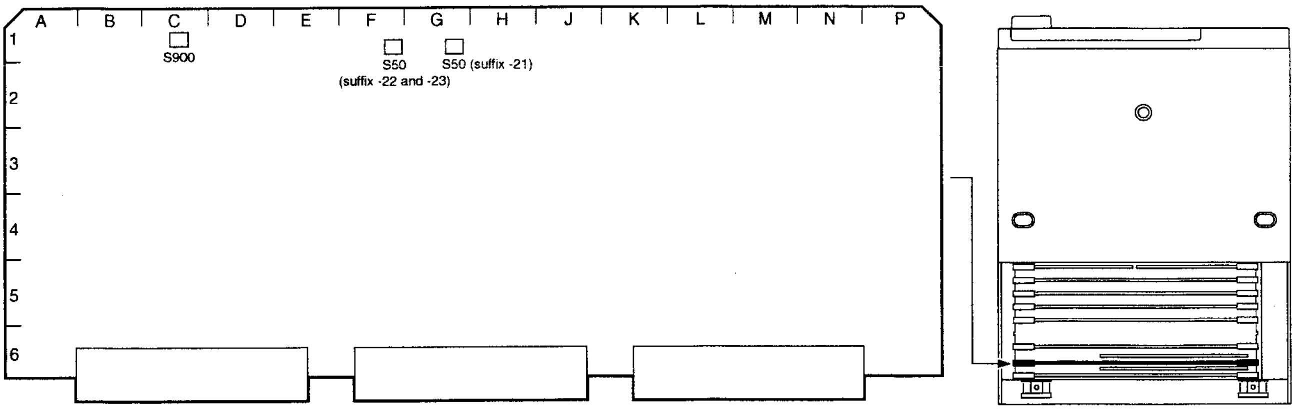
HIF-1 Board

Note

Never change the setting of the factory use switches.

Refer to Section 1-12 for removing/reattaching the plug-in board.

Refer to Section 5-1-1 for models in which this board is used.


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
3
4
5
6
S900
S50
S50 (suffix -21)
(suffix -22 and -23)

HIF-1 Board (Side A)

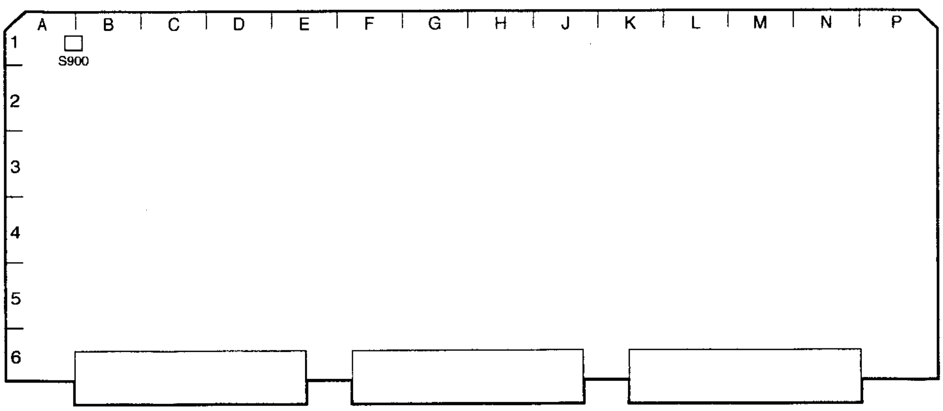
< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S50	1 to 2	—	Factory use	OFF
(S50 is not used on the HIF-1 board with suffix -24 and higher.)				
S900	1 to 4	—	Factory use	OFF

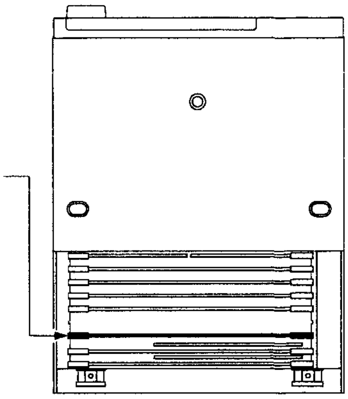
HPR-1 Board

Note

Never change the setting of the factory use switches.
Refer to Section 1-12 for removing/reattaching the plug-in board.
Refer to Section 5-1-1 for models in which this board is used.



HPR-1 Board (Side A)



< Top View >

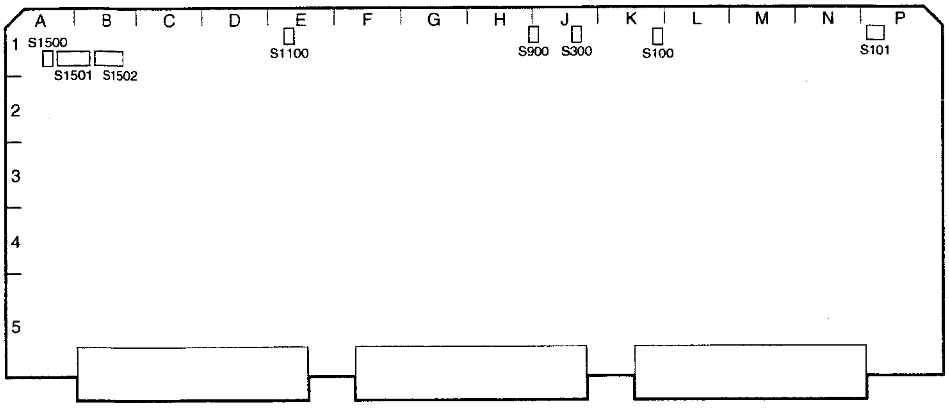
Ref. No.	Bit	Name	Description	Factory setting
S900	1 to 4	—	Factory use	OFF

SS-89 Board

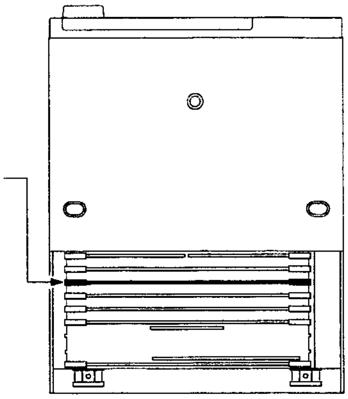
Note

Never change the settings of the factory use switches.

Refer to Section 1-12 for removing/reattaching the plug-in board.



SS-89 Board (Side A)



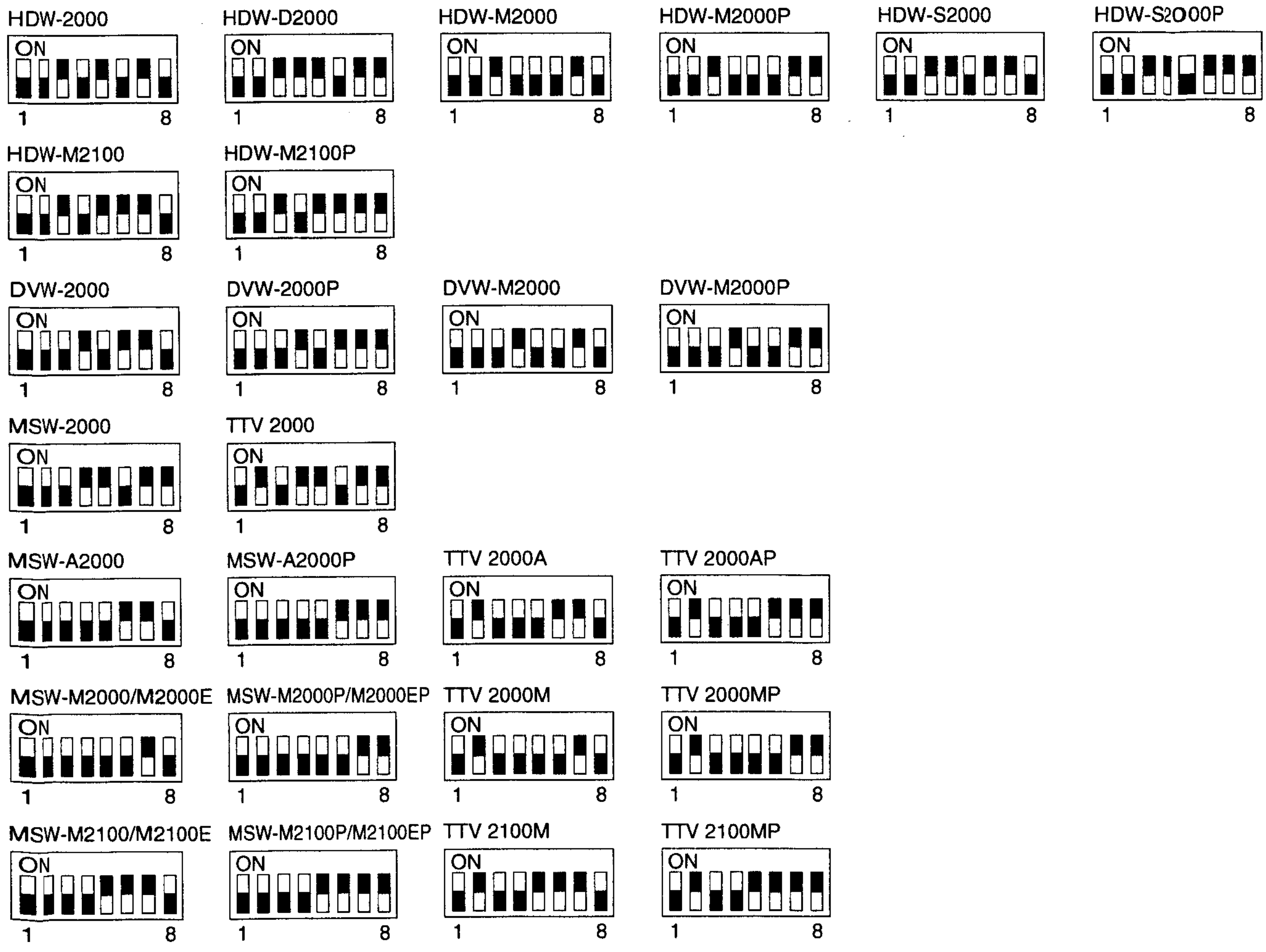
< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S100	—	LOG	Press to stop/update SV log	———
S101	1	—	ON: Activates the tracking control VR OFF: Disables the tracking control VR **Note** Tracking control VR : RV300 on SS-89 board	OFF
	2	—	Factory use	OFF
	3	DT WOBBLING	ON: Turn OFF the DT WOBBLING function OFF: Turn ON the DT WOBBLING function	OFF
	4	SV ERR DISABLE	OFF: Activates (Normal) ON: inactivates **Note** Selects whether to activate detection of operation error of servo circuit	OFF
S300	—	R-SHFT	Press to change reel position However, does not function when the cassette compartment is attached	———
S900	—	RESET	Press to reset this unit	———
S1100	—	LOG	Press to prohibit SYS CPU log update	
S1500	—	MAINTE MODE START	Press to start maintenance mode	———

(Continued)

Ref. No.	Bit	Name	Description	Factory setting
S1501		**Note** Do not change the settings of S1501 bit-1 through bit-6 because these are set according to the feature of each model. However, set this switch according to this unit when the board have been replaced.		
	1	—	Factory use	OFF
	2 to 6	model ID	Model ID	See below
	7	J/SY	OFF: Models for Japan ON: Models except for Japan	ON
	8	525/625	OFF: 525/60 model ON: 625/50 model	See below
S1502		**Note** The factory settings of S1502 bit-1 and bit-2 are different with HDW, DVW and MSW series.		
	1	EXTENDED MENU	OFF: Does not display Extended menu of setup menu ON: Displays Extended menu of setup menu	OFF (DVW, MSW series) ON (HDW series)
	2	MAINTE MODE ACCESS	OFF: Disables access to maintenance mode from lower control panel ON: Enables access to maintenance mode from lower control panel	OFF (DVW, MSW series) ON (HDW series)
	3 to 5	—	Factory use	OFF
	6	CUSTOMIZE MENU	OFF: Disables access to Setup menu customize mode ON: Enables access to Setup menu customize mode	OFF
	7, 8	—	Factory use	OFF

S1501 factory setting (▮: Knob position)


HDW-2000
HDW-D2000
HDW-M2000
HDW-M2000P
HDW-S2000
HDW-S2000P
HDW-M2100
HDW-M2100P
DVW-2000
DVW-2000P
DVW-M2000
DVW-M2000P
MSW-2000
TTV 2000
MSW-A2000
MSW-A2000P
TTV 2000A
TTV 2000AP
MSW-M2000/M2000E
MSW-M2000P/M2000EP
TTV 2000M
TTV 2000MP
MSW-M2100/M2100E
MSW-M2100P/M2100EP
TTV 2100M
TTV 2100MP
ON
1
8

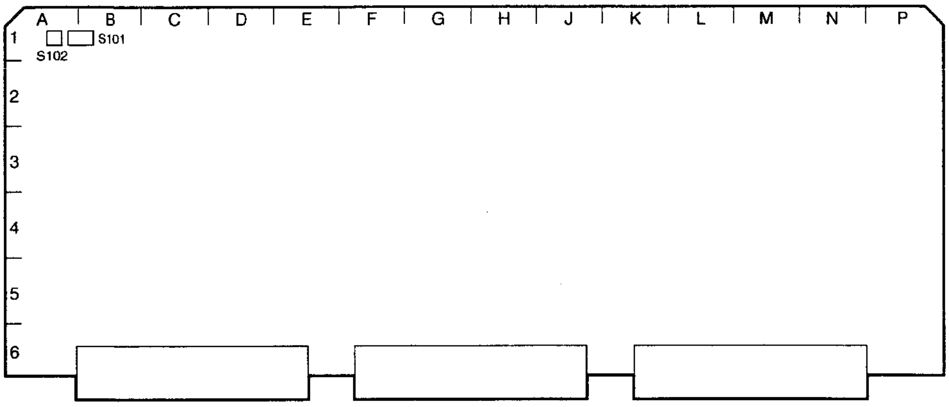
VN-13 Board

Note

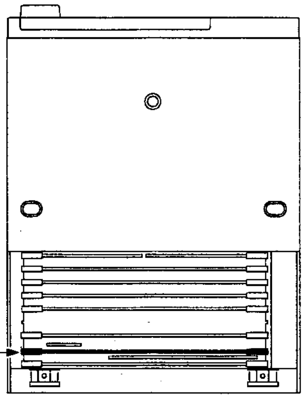
Never change the settings of the factory use switches.

Refer to Section 1-12 for removing/reattaching the plug-in board.

Refer to Section 5-1-1 for models in which this board is used.



VN-13 Board (Side A)



< Top View >

Ref. No.	Bit	Name	Description	Factory setting
S101*1	1 to 8	—	Factory use	OFF
S101*2	1 to 3	—	Factory use	OFF
	4	Function select	Select the function only when the EPR-1 board number suffix is -12 or -13. ON: Selects the SDTI-CP input/output function. OFF: Selects the MXF file receive/transmit function.	OFF
	5 to 8	—	Factory use	OFF
S102	1	—	Factory use	ON *1/OFF *2
	2	—	Factory use	OFF

*1: board number suffix -11, -12

*2: board number suffix -13 and higher

1-15. Circuit Protection Parts (Fuse/IC Link)

This unit is equipped with circuit protection parts such as fuse and IC link. These parts melt when overcurrent flows or the unit overheats when problems occur.
When replacing these parts, be sure to use the following designated parts.
Correct the cause resulting in the melting of these parts before replacement.

WARNING

Use Designated Parts
The fuse/IC link is an important part for ensuring safety. Replacement with parts other than those designated will result in fire hazards and electric hazards. Therefore be sure to use only designated parts.

Note

Refer to Section 5-1-1 for models in which boards are used.

Board	Ref. No.	Part No./Description
AE-31	PS850 (B-4) PS851 (A-1) PS852 (A-4)	⚠1-533-282-21 On-chip IC link 2 A
APR-52	F1700 (B-5)	⚠1-533-999-21 On-chip fuse 2 A, 125 V
	F1701 (B-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	F1702 (B-5) F1703 (A-6)	⚠1-533-999-21 On-chip fuse 2 A, 125 V
AU-272	PS300 (B-4) PS301 (B-4) PS302 (B-4) PS303 (B-4) PS304 (B-4)	⚠1-533-282-21 On-chip IC link 2 A
CP-371	F1 (D-3)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	PS1 (A-5) PS702 (A-6)	⚠1-576-259-21 On-chip IC link 0.6 A
CUE-13	(Suffix: -12 and higher) PS300 (D-2) PS301 (D-2) PS302 (D-2) (Suffix: -11) F300 (D-2) F301 (D-2) F302 (D-2)	⚠1-533-282-21 On-chip IC link 2 A
DPR-155	F801 (B-6) (Suffix: -14 and higher)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	F802 (A-5) F803 (A-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
DPR-229	F800 (A-5) F802 (A-5) F803 (A-6)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
DR-414/508	F1 (D-2) (DR-508)	⚠1-576-328-21 On-chip fuse 8 A, 125 V
	F400 (A-3) F500 (A-3)	⚠1-576-269-11 On-chip fuse 3.15 A, 125 V
	F700 (E-2)	⚠1-533-627-21 On-chip fuse 5 A, 125 V
	F701 (D-1) (DR-414)	⚠1-576-269-11 On-chip fuse 3.15 A, 125 V
	F701 (D-1) (DR-508)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	F702 (D-1) F703 (D-1) F704 (D-1) F705 (C-1)	⚠1-576-212-21 On-chip fuse 1.25 A, 125 V
	F706 (E-4) F800 (C-3) F1000 (E-3)	⚠1-533-627-21 On-chip fuse 5A, 125 V
DT-47	F1 (D-3)	⚠1-576-212-21 On-chip fuse 1.25 A, 125 V
DU-178	F1	⚠1-576-270-21 On-chip fuse 4 A, 125 V
EPR-1	F1 (A-4) (Suffix: -14)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	F2 (B-4) F3 (B-4)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
EQ-84	F100 (D-5) F101 (C-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
FP-133	F1 (A-2)	⚠1-576-269-11 On-chip fuse 3.15 A, 125 V
HIF-1	F1000 (B-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
	F1001 (B-5) (Suffix: -22 and higher)	⚠1-576-329-11 On-chip fuse 10 A, 125 V
	F1001 (B-5) (Suffix: -21)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
HP-101	F1 (D-1)	⚠1-533-282-21 On-chip IC link 2A
HPR-1	F1000 (B-5) F1001 (B-5) F1002 (B-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
SS-89	F900 (B-5) F901 (B-5) F902 (B-5) F903 (A-5)	⚠1-533-212-21 On-chip fuse 1.25 A, 125 V
TC-104	PS400 (D-4) PS401 (D-4) PS402 (D-2)	⚠1-533-282-21 On-chip IC link 2 A
VN-13	F301 (B-5) F302 (A-5) F303 (A-5)	⚠1-576-270-21 On-chip fuse 4 A, 125 V
VPR-64/91	F1500 (B-5) F1501 (B-5) F1502 (C-5)	⚠1-533-627-21 On-chip fuse 5 A, 125 V

Note: The brackets ( ) show the address on the board.

1-16. Memory IC with Backup Battery

Memory IC (RAM, IC111) with backup battery is used on the FP-133 board.
This IC is used to store the setting data of setup menu, etc.
Besides it has an RTC (Real Time Clock) function, which is also used in the VTR.
Owing to this battery, even if the external power is cut off, this IC can maintain the stored data and the RTC continues operating.
However, if the battery life comes to end with the external power was cut off, memory can not maintain the stored data and the RTC is failing to function.

In the memory, the following data is stored. When the battery is dead, or replaced with a new one, resetting current menu, menu banks 1 to 4, and calender/clock is required. For details on how to reset the current menu and menu banks, refer to the operation manual supplied with the unit.
When the battery is dead or replaced, error log data and shot-mark detection list data are all cleared.

- Current menu
- Menu banks 1 to 3
- Calender/Clock
- ID-code data
- Error log data
- Shot-mark detection list data

Backup battery

Refer to Section 1-17.

Replacement time

When life-ending the battery while the VTR is powered off, the RTC is failing to function.
If powered on in such a condition, the error code 96, sub error message "CALENDAR CLOCK" will be displayed.
This message is displayed, be sure to replace the backup battery.

Notes

- The sub error message is displayed superimposed on the video monitor connected to the VIDEO OUTPUT COMPOSITE 3 (SUPER) connector or SDI OUTPUT 3 (SUPER) connector when F4 (CHAR) of the function menu Page 4 is set to ON.
- When the error code 96, sub error message "CALENDAR CLOCK" is displayed, the date in the calendar will be reset to 16/Aug. 2000.
  You can check the date in calendar/clock using the error logger display mode (M2 : ERROR LOGGER) in the maintenance mode.

1-17. Memory Backup Battery Replacement

The unit is equipped with a battery for the memory (IC111) backup on the FP-133 board. When replacing, be sure to use the specified part.

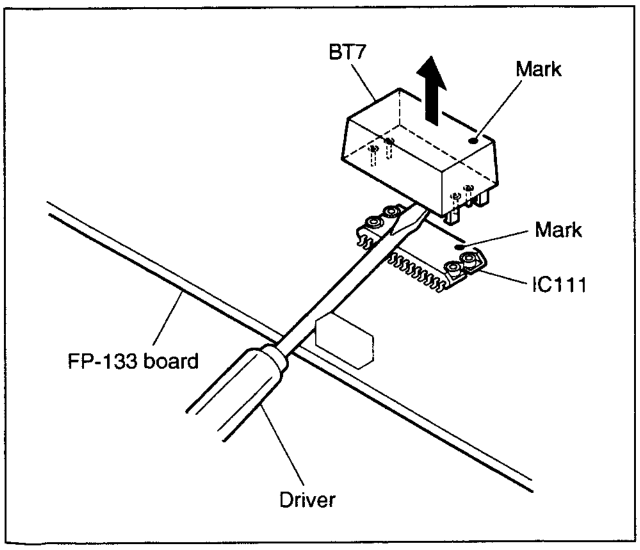
Replacement part:	BT7/FP-133 board
Part description:	M4T28-BR12SH1 (lithium battery)
Part No.:	1-767-156-11
Recommended replacement period:	Every seven years

Replacement

Note

When replacing the battery, ensure that a mark on the battery is correctly oriented as shown in the following figure.

1. Remove the FP-133 board from this unit. (Refer to Section 5-27-12.)
2. Insert a flat blade driver between BT7 and IC111 to remove the battery.
3. Carefully install a new battery, ensuring that the mark's on the BT7 and IC111 are aligned.
4. Reset the current menu and menu banks. (Refer to the operation manual.)
5. For the ID-code data-using unit:
   Set the ID-code data. (Refer to the operation manual, the setup menu ITEM-603.)
6. Reset the calender/clock. (Refer to Section "3-4-3. Setting Mode".)



1-18. NV-RAM

There are the NV-RAMs (EEP-ROM, and RAM with backup battery) used on the boards in this unit. These devices store the adjustment data, various setting data for this unit, data for the hours meters and error log respectively, etc.

EEP-ROM: Electric Erasable P-ROM

After replacing above-mentioned device, take the following service actions.
IC111 on the FP-133 board is the only NV-RAM with backup battery.

Note

After replacing the NV-RAM, the error (error code 95, 96, 97, or 98) will occur at power-on.

After replacing IC114, 115/FP-133: Occurs Error code 95. } Then, settings are reset to factory
After replacing IC111/FP-133: Occurs Error code 96. } setting.
After replacing IC101/DR-508 or DR-414: Occurs Error code 97.
After replacing IC1110/EQ-84: Occurs Error code 98.
After replacing IC1805/DM-123: Occurs Error code 98.

The error for IC7 and IC16 on the FP-119 board will not occur at the second power-on and later.

Board / Ref.No.	Type	Stored data	Service action after replacing
CP-371 / IC716	NV-RAM	Adjustment data for the CP-371 board	Readjust the CP-371 board (video remote). (Perform Section 3-3-8.)
DIF-134 / IC101 (HKDW-102)	NV-RAM	Adjustment data for the DIF-134 board	Readjust the DIF-134 board (SDTI input/output system). (Perform Section 8-8.)
DM-123 / IC1805	NV-RAM	Adjustment data for the DM-123 board	Readjust the DM-123 board (analog video playback system). (Perform Section 8-7.)
DR-414 / IC101. DR-508 / IC101	NV-RAM	Servo/DT adjustment data	Readjust the servo/DT systems. (Perform Section 8-3.)
		Hours meter data	None
		Serial number	Set by the menu M31 of the maintenance mode.
EQ-84 / IC1100	NV-RAM	Adjustment data for the EQ-84 board	Readjust the EQ-84 board (RF system). (Perform Section 8-4.)
FP-133 / IC111	NV-RAM	Setting data of setup menu	Set the setup menu again. (Refer to the operation manual for resetting.)
		Error log data	None (All data are lost.)
		Shotmark detection list data	None (All data are lost.)
		ID code data	Set by setup menu ITEM-603 again.
		Calendar/clock	Set the calendar and clock again. (Refer to Section 3-4-3.)
		Setting data of HD SDI/SD video output	Set by the menu M3A of the maintenance mode again.
FP-133 / IC114, 115	EEP-ROM	Headroom of audio level meter	Set by the menu M37 of the maintenance mode again.
		Setting data for ISR	Set by the menu M32 of the maintenance mode again.
		50-pin remote setting data	Set by the menu M39 of the maintenance mode again.
		15-pin video remote unity level data	Set by the menu A7 of the maintenance mode again.
		Customer setting data of function menu HOME 2 page	Set by the menu M38 of the maintenance mode again.
VPR-64 / IC1512 VPR-91 / IC1512	NV-RAM	Adjustment data for the VPR-64/91 board	Readjust the VPR-64/91 board (video system). (Perform Section 8-6.)
		Adjustment data for the SDI-52 board	Readjust the SDI-52 board (SDI input/output system). (Perform Section 8-8.)

Refer to Section 3 for the menu of the maintenance mode.

1-19. Equipment and Fixtures List for Check/Adjustment

1-19-1. Equipment for Check/Adjustment

It is recommended to use the equipment listed below or the equivalents.
Each equipment is available as a standard product.

Equipment	Model name	Remarks
Analog composite video signal generator (with GENLOCK mode)	Tektronix 1410	(For 525/60 system)
	Tektronix 1411	(For 625/50 system)
Analog composite video signal generator	Tektronix TSG-130A	(For 525/60 system)
	Tektronix TSG-131A	(For 625/50 system)
Analog component video signal generator	Tektronix TSG-300	For SMPTE/EBU format analog video signal generation (For 525/60 system)
	Tektronix TSG-371	For SMPTE/EBU format analog video signal generation (For 625/50 system)
Digital component video signal generator	Tektronix TSG-422 (OP.1S)	For 4:2:2 format digital video signal generation
Spectrum analyzer	Advantest R3261A	Frequency band: 100 MHz or above
Oscilloscope	Tektronix TDS460A	For measuring analog component video level
Analog component waveform monitor	Tektronix WFM-300A	
Analog composite waveform/vector monitor	Tektronix 1750A	For measuring analog composite SCH (For 525/60 system)
	Tektronix 1751A	For measuring analog composite SCH (For 625/50 system)
Serial digital component waveform monitor	Tektronix WFM-601i	
HD digital video signal generator *1	Tektronix TG700 (with optional accessory.HDVG7, DVG7, AGL7, AG7)	SMPTE274M
HD digital waveform monitor *1	Tektronix WFM-1125	
HD digital input monitor *1	Sony BVM-D14 (with optional accessory BKM-142HD)	
Audio signal generator	Tektronix SG5010	
Audio analyzer	Audio Precision System One or System Two	
Audio level meter	Hewlett-Packard HP3400A	
Frequency counter	Advantest TR5821AK	
Digital voltmeter	Advantest TR6845	
Serial digital input monitor	Sony BVM-1311 (with optional accessory BKM-2085-14)	(For 525/60 system)
	Sony BVM-1411 (with optional accessory BKM-2085-14)	(For 625/50 system)
Network analyzer	Anritsu MS-420B	
Time code generator	Sony BVG-1600	(For 525/60 system)
	Sony BVG-1600PS	(For 625/50 system)
Time code reader	Sony BVG-1500	(For 525/60 system)
	Sony BVG-1500PS	(For 625/50 system)
Terminator	—	75 Ω, BNC type
BNC T adapter	—	75 Ω
Cleaning tape	Sony BCT-HD12CL	
Recording tape	Sony BCT-HD series *1	Cassette tape for HDCAM
	Sony BCT-D series *2	Cassette tape for Digital Betacam
	Sony BCT-MX series *3	Cassette tape for MPEG IMX

*1 : HDW series only *2 : DVW series only *3 : MSW series only

1-19-2. Fixtures

Fig. No.	Part No.	Description	[Inscription No.]	Usage
①	J-6035-070-A	Extraction tool (for PLCC socket)	—	Extraction of IC (PLCC type)
②	J-6080-029-A	Small dental mirror (round type ϕ12)	—	Tape path adjustment
③	J-6251-090-A	Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 120 mm)	—	Tightening screws to fix a drum assembly and upper drum assembly
④	J-6323-420-A	Torque screwdriver's bit (+2 mm, l = 75 mm)	—	Tightening screws to fix a brush/slip ring assembly
	J-6323-430-A	Torque screwdriver's bit (+3 mm, l = 90 mm)	—	Tightening screws to fix a reel motor assembly or a ring roller
⑤	J-6252-510-A	Torque screwdriver (0.6 N•m) {6 kgf•cm}	[JB-5251]	Tightening screws
	J-6252-520-A	Torque screwdriver (1.2 N•m) {12 kgf•cm}	[JB-5252]	Tightening screws
⑥	J-6322-610-A	Tape guide adjustment driver	[MW-261]	Tape path alignment
⑦	A-8324-911-A	Extension board, EX-739	—	Extension of the plug-in board
⑧	A-8325-508-A	Relay board, EX-802	—	Extension of the connector panel
⑨	A-8325-509-A	Relay board, EX-805	—	
⑩	A-8325-510-A	Extension board, EX-761	—	
⑪	A-8327-683-A*	Extension board, EX-797	—	Extension of the CUE-13 board
⑫	1-677-293-21	Extension flexible board (FL-276)	—	Extension of the DR-414/508 board
⑬	1-960-985-11	Extension harness (DC OUT)	—	Extension of the power supply unit
⑭	3-184-527-01	Cleaning cloth (15 cm × 15 cm)	—	Cleaning
⑮	7-432-114-11	Locking compound (200 g)	—	Inhibits loosening of screws
⑯	7-661-018-18	Diamond oil NT-68 (50 ml)	—	
⑰	7-651-000-10	Sony grease SGL-601 (50 g)	—	
⑱	7-700-736-05	L-shaped hexagonal wrench (d = 1.5 mm)	—	
	7-700-736-06	L-shaped hexagonal wrench (d = 0.89 mm)	—	
⑲	7-700-766-04	Hexagonal wrench driver (d = 2.5 mm)	—	
⑳	8-960-076-01*	Alignment tape, HR5-1A	—	Video/audio alignments (for HDCAM system)
	8-960-076-11*	Alignment tape, HR2-1A	—	Tracking adjustment (for HDCAM system)
㉑	8-960-073-01*	Alignment tape, ZR5-1	—	Video/audio alignments (for 525/60 Digital Betacam system)
	8-960-073-11*	Alignment tape, ZR2-1	—	Tracking adjustment (for 525/60 Digital Betacam system)
	8-960-073-51*	Alignment tape, ZR5-1P	—	Video/audio alignments (for 625/50 Digital Betacam system)
	8-960-073-61*	Alignment tape, ZR2-1P	—	Tracking adjustment (for 625/50 Digital Betacam system)
㉒	8-960-077-01*	Alignment tape, MR5-1	—	Video/Audio alignments (for 525/60 MPEG IMX system)
	8-960-077-51*	Alignment tape, MR5-1P	—	Video/Audio alignments (for 625/50 MPEG IMX system)
	8-960-077-61*	Alignment tape, MR2-1P	—	Tracking Adjustment (for MPEG IMX)
	8-960-075-01*	Alignment tape, SR5-1	—	Video/audio alignments (for 525/60 Betacam SX system)
	8-960-075-51*	Alignment tape, SR5-1P	—	Video/audio alignments (for 625/50 Betacam SX system)

*: See next page.

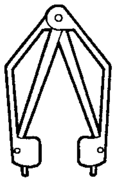
(Continued)

Fig. No.	Part No.	Description	[Inscription No.]	Usage
㉓	8-960-096-01*	Alignment tape, CR2-1B	—	Tracking adjustment (for analog Betacam NTSC)
	8-960-096-41*	Alignment tape, CR5-1B (metal particle tape)	—	Video alignments (for analog Betacam NTSC)
	8-960-096-51*	Alignment tape, CR2-1B PS	—	Tracking adjustment (for analog Betacam PAL)
	8-960-097-44*	Alignment tape, CR5-2A (oxide tape)	—	Video alignments (for analog Betacam NTSC)
	8-960-097-45*	Alignment tape, CR8-1A (oxide tape)	—	Audio alignments (for analog Betacam NTSC)
	8-960-096-91*	Alignment tape, CR5-1B PS (metal particle tape)	—	Video alignments (for analog Betacam PAL)
	8-960-096-86*	Alignment tape, CR8-1B PS (metal particle tape)	—	Audio alignments (for analog Betacam PAL)
	8-960-098-44*	Alignment tape, CR5-2A PS (oxide tape)	—	Video alignments (for analog Betacam PAL)
	8-960-098-45*	Alignment tape, CR8-1A PS (oxide tape)	—	Audio alignments (for analog Betacam PAL)
㉔	9-919-573-01	Cleaning fluid	—	Cleaning
㉕	J-6332-240-A	VISC phase adjusting tool	—	VISC alignment for PAL system (for PAL model only)
㉖	J-6530-650-A	Head tip protrusion measurement gauge	—	Head tip protrusion check of the video heads
㉗	1-772-003-11	IC memory card (2 MB), MB98A81183	—	Setup data download/upload, Software update
	1-772-004-11	IC memory card (4 MB), MB98A81273	—	
㉘	3-205-709-01	SUPPORT	—	For securing the connector panel
㉙	J-6531-200-A	Cable for RS-232C Terminals	—	For updating of control panel firmware
㉚	J-6531-210-A	Parallel Cable III	—	For writing of ROM/CPLD data
㉛	J-6531-220-A	Harness	—	For writing of ROM/CPLD data
—	—	Adjustment driver (ceramic)	—	For Tele-File system adjustment

*: Used for specified models listed below.

Description	**Models**										
	HDW-					**DVW-**		**MSW-**			
	2000	**D2000**	**M2000** **M2000P**	**S2000** **S2000P**	**M2100** **M2100P**	**2000** **2000P**	**M2000** **M2000P**	**2000**	**A2000** **A2000P**	**M2000** **M2000P** **M2000E** **M2000EP**	**M2100** **M2100P** **M2100E** **M2100EP**
Extension board, EX-797	O	O	O	O	O	O	O	—	—	O	O
Alignment tape											
HR5-1A	O	O	O	O	O	—	—	—	—	—	—
HR2-1A	O	O	O	O	O	—	—	—	—	—	—
ZR5-1	—	O	O	—	O	N	N	—	—	O	O
ZR2-1	—	—	—	—	—	N	N	—	—	—	—
ZR5-1P	—	O	O	—	O	P	P	—	—	O	O
ZR2-1P	—	—	—	—	—	P	P	—	—	—	—
MR5-1	—	O	O	—	O	—	N	O	O	O	O
MR5-1P	—	O	O	—	O	—	P	O	O	O	O
MR2-1P	—	—	—	—	—	—	—	O	O	O	O
SR5-1	—	—	O	O	O	—	N	O	O	O	O
SR5-1P	—	—	O	O	O	—	P	O	O	O	O
CR2-1B	—	—	N	N	N	—	N	—	N	N	N
CR5-1B	—	—	O	O	O	—	N	—	O	O	O
CR2-1B PS	—	—	P	P	P	—	P	—	P	P	P
CR5-2A	—	—	O	O	O	—	N	—	O	O	O
CR8-1A	—	—	N	N	N	—	N	—	N	N	N
CR5-1B PS	—	—	O	O	O	—	P	—	O	O	O
CR8-1B PS	—	—	P	P	P	—	P	—	P	P	P
CR5-2A PS	—	—	O	O	O	—	P	—	O	O	O
CR8-1A PS	—	—	P	P	P	—	P	—	P	P	P

O: Required
N: Required for NTSC model
P: Required for PAL model
—: Not required

①


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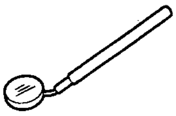

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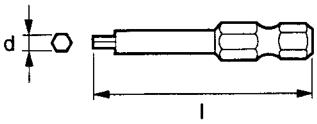

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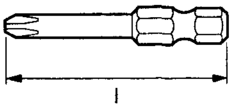

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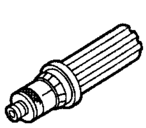

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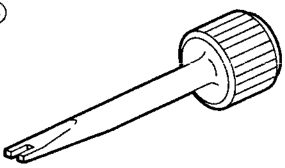

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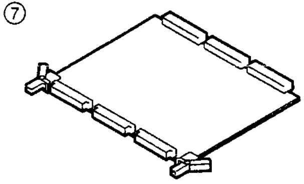

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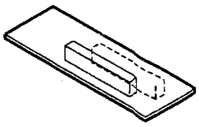

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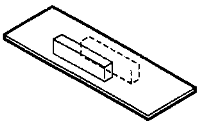

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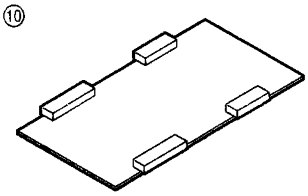

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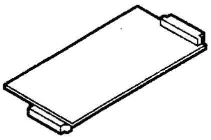

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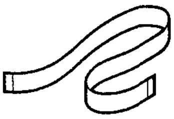

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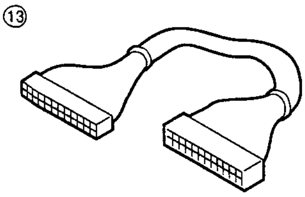

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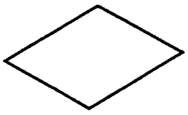

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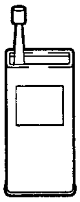

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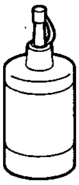

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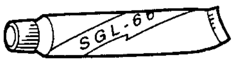

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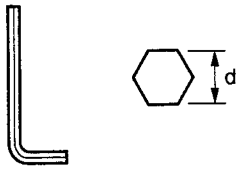

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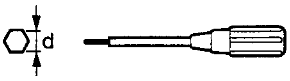

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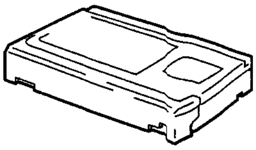

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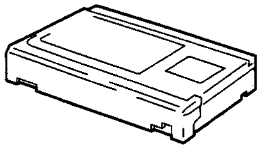

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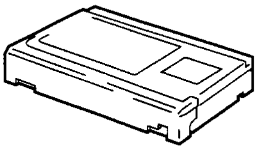

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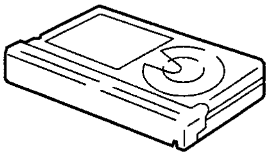

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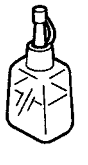

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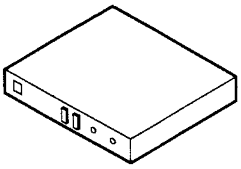

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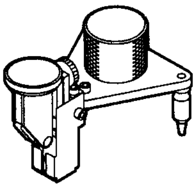

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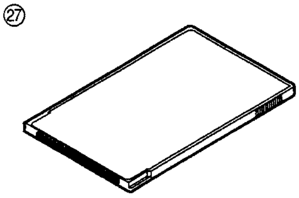

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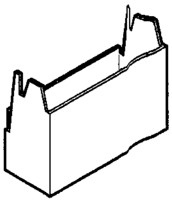

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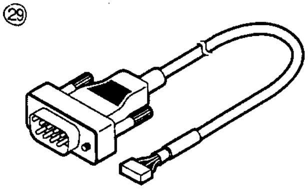

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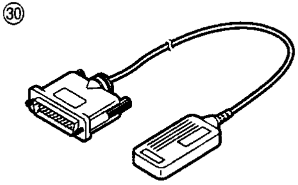

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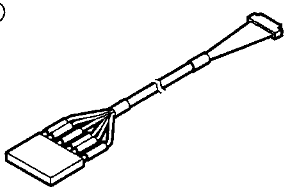


1-20. Alignment Tapes

This section describes alignment tapes used for adjusting the unit.

1. HR5-1A (SONY part No. 8-960-076-01) : For HDCAM

Used for video/audio adjustment of HDW series.

Time (min. : sec.)	Digital video	Digital audio	CUE	CTL track
00:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	1 kHz 0 VU	CTL
01:25 -	100 % color-bar	1 kHz sine wave, −20 dB FS	Blank	CTL
01:30 -	100 % color-bar	1 kHz sine wave, −20 dB FS	1 kHz −20 VU	CTL
02:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	1 kHz −20 VU	CTL
02:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
02:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	3 kHz −20 VU	CTL
02:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
03:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	7 kHz −20 VU	CTL
03:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
03:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	10 kHz −20 VU	CTL
03:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
04:00 -	100 % color-bar	−∞ dB FS	12 kHz −20 VU	CTL
04:25 -	100 % color-bar	−∞ dB FS	Blank	CTL
04:30 -	100 % color-bar	−∞ dB FS	90 Hz −20 VU	CTL
04:55 -	100 % color-bar	−∞ dB FS	Blank	CTL
05:00 -	100 % color-bar	−∞ dB FS	Repeat	CTL
06:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	Repeat	CTL
08:00 -	100 % color-bar	20 kHz sine wave, −20 dB FS	Repeat	CTL
10:00 -	Ramp	Repeat	Repeat	CTL
20:00 - 30:00	Multi Burst	–	–	CTL

2. HR2-1A (SONY part No. 8-960-076-11) : For HDCAM

Used for servo adjustment of HDW series.
(The alignment tape can be used for the 59.94 Hz, 50 Hz, and 24 Hz modes.)

Time (min. : sec.)	Digital video/Digital audio	CUE	CTL track
00:00 - (Pulse*)	5.875 MHz (A CH only)	1 kHz 0 VU	CTL
15:00 -	5.875 MHz (A/C CH only)	12 kHz 0 VU	CTL
20:00 - 25:00	First half : 5.875 MHz Latter half : 23.5 MHz (A/C CH only) First half : 23.5 MHz Latter half : 5.875 MHz (B/D CH only)	12 kHz 0 VU	CTL
25:00 - 30:00	23.5 MHz (All CH)	12 kHz 0 VU	CTL

*: The time code data is not recorded on the time code track during pulse portion (00:00 to 15:00). This portion is recorded the duty 7:3 pulse on the CTL track. Therefore, when playing back this portion, time data which is interpolated by the time code signal is displayed.

3. MR5-1 (SONY part No. 8-960-077-01): For 525/60 MPEG IMX system
MR5-1P (SONY part No. 8-960-077-51): For 625/50 MPEG IMX system

Used for video/audio adjustment of HDW-D/M, DVW-M and MSW series.

Time (min. : sec.)	Digital video	Digital audio	CTL track
0:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
2:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
4:00 -	100 % color-bar	–∞ dB FS	CTL
6:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
8:00 -	100 % color-bar	20 kHz sine wave, –20 dB FS	CTL
10:00 -	Ramp	1 kHz sine wave, –20 dB FS	CTL
12:00 -	Ramp	1 kHz sine wave, 0 dB FS	CTL
14:00 -	Ramp	–∞ dB FS	CTL
16:00 -	Ramp	20 Hz sine wave, –20 dB FS	CTL
18:00 -	Ramp	20 kHz sine wave, –20 dB FS	CTL
20:00 -	100 % color-bar	1 kHz sine wave, –20 dB FS	CTL
22:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
24:00 -	100 % color-bar	–∞ dB FS	CTL
26:00 -	100 % color-bar	20 Hz sine wave, –20 dB FS	CTL
28:00 - 30:00	100 % color-bar	20 kHz sine wave, –20 dB FS	CTL

4. MR2-1P (SONY part No. 8-960-077-61): For MPEG IMX

Used for servo adjustment of MSW series.

(This alignment tape can be used both 525 and 625 modes.)

Time (min. : sec.)	Digital video/Digital audio	CTL track
00:00 - (Pulse*)	8T (2.9 MHz) (AC CH)	CTL
15:00 -	8T (2.9 MHz) (B/D CH)	CTL
20:00 - 25:00	2T (11.4 MHz) (All CH)	CTL

*: The time code data is not recorded on the time code track during pulse portion (00:00 to 15:00). This portion is recorded the duty 7:3 pulse on the CTL track. Therefore, when playing back this portion, time data which is interpolated by the time code signal is displayed.

5. SR5-1 (SONY part No. 8-960-075-01): For 525/60 Betacam SX system
SR5-1P (SONY part No. 8-960-075-51): For 625/50 Betacam SX system

Used for video/audio adjustment of HDW-M/S, DVW-M and MSW series.

Time (min. : sec.)	Digital video	Digital audio	CTL track
0:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	CTL
2:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
4:00 -	100 % color-bar	−∞ dB FS	CTL
6:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	CTL
8:00 -	100 % color-bar	20 kHz sine wave, −20 dB FS	CTL
10:00 -	Ramp	1 kHz sine wave, −20 dB FS	CTL
12:00 -	Ramp	1 kHz sine wave, 0 dB FS	CTL
14:00 -	Ramp	−∞ dB FS	CTL
16:00 -	Ramp	20 Hz sine wave, −20 dB FS	CTL
18:00 -	Ramp	20 kHz sine wave, −20 dB FS	CTL
20:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	CTL
22:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	CTL
24:00 -	100 % color-bar	−∞ dB FS	CTL
26:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	CTL
28:00 - 30:00	100 % color-bar	20 kHz sine wave, −20 dB FS	CTL

6. ZR5-1 (SONY part No. 8-960-073-01) : For 525/60 digital Betacam system
ZR5-1P (SONY part No. 8-960-073-51) : For 625/50 digital Betacam system

Used for video/audio adjustment of HDW-D/M, DVW and MSW-M series.

Time (min. : sec.)	Digital video	Digital audio	CUE	CTL track
00:00 -	100 % color-bar	1 kHz sine wave, −20 dB FS	1 kHz 0 VU	CTL
01:25 -	100 % color-bar	1 kHz sine wave, −20 dB FS	Blank	CTL
01:30 -	100 % color-bar	1 kHz sine wave, −20 dB FS	1 kHz −20 VU	CTL
02:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	1 kHz −20 VU	CTL
02:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
02:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	3 kHz −20 VU	CTL
02:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
03:00 -	100 % color-bar	1 kHz sine wave, 0 dB FS	7 kHz −20 VU	CTL
03:25 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
03:30 -	100 % color-bar	1 kHz sine wave, 0 dB FS	10 kHz −20 VU	CTL
03:55 -	100 % color-bar	1 kHz sine wave, 0 dB FS	Blank	CTL
04:00 -	100 % color-bar	−∞ dB FS	12 kHz −20 VU	CTL
04:25 -	100 % color-bar	−∞ dB FS	Blank	CTL
04:30 -	100 % color-bar	−∞ dB FS	90 Hz −20 VU	CTL
04:55 -	100 % color-bar	−∞ dB FS	Blank	CTL
05:00 -	100 % color-bar	−∞ dB FS	Repeat	CTL
06:00 -	100 % color-bar	20 Hz sine wave, −20 dB FS	Repeat	CTL
08:00 -	100 % color-bar	20 kHz sine wave, −20 dB FS	Repeat	CTL
10:00 -	Ramp	Repeat	Repeat	CTL

7. ZR2-1 (SONY part No. 8-960-073-11): For 525/60 digital Betacam system
ZR2-1P (SONY part No. 8-960-073-61): For 625/50 digital Betacam system

Used for servo adjustment of DVW series.

Time (min. : sec.)	Digital video	CUE	CTL track
00:00 - (Pulse*)	4 MHz (A CH only)	1 kHz, 0 VU	CTL
15:00 -	A/C CH : 4 MHz B/D CH : 8 MHz	12 kHz, 0 VU	CTL
20:00 -	16 MHz (All CH)	12 kHz, 0 VU	CTL
25:00 - 27:00	50 % flat field (All CH)	No signal	CTL

*: The time code data is not recorded on the time code track during pulse portion (00:00 to 15:00). This portion is recorded the duty 7:3 pulse on the CTL track. Therefore, when playing back this portion, time data which is interpolated by the time code signal is displayed.

8. CR2-1B (SONY part No. 8-960-096-01): For analog Betacam, NTSC
CR2-1B PS (SONY part No. 8-960-096-51): For analog Betacam, PAL

Used for tracking adjustment of HDW-M/S, DVW-M and MSW-A/M series.

Time (min. : sec.)	Video Track	AFM	LAU track	CTL track
00:00 - 28:00 (Pulse*)	Y : 4 MHz C : 5 MHz	No signal	No signal	CTL

*: The time code data is not recorded on the time code track of this tape. But the duty 7:3 pulse is recorded on the time code track. Therefore, when playing back this tape, time data which is interpolated by the CTL signal is displayed.

9. CR5-1B (SONY part No. 8-960-096-41): For analog Betacam, NTSC
CR5-1B PS (SONY part No. 8-960-096-91): For analog Betacam, PAL

Used for Betacam video/audio adjustment of HDW-M/S, DVW-M and MSW-A/M series.

Time (min. : sec.)	Video	AFM	LAU tracks	CTL track
0:00 -	RF sweep	No signal	No signal	CTL
2:00 -	60 % H sweep (CTDM)	No signal	No signal	CTL
5:00 -	Pulse & Bar (CTDM)	No signal	No signal	CTL
8:00 -	60 % multi-burst	No signal	No signal	CTL
11:00 -	Pulse & Bar	No signal	No signal	CTL
14:00 -	CR5-1B: 75 % color-bar CR5-1B PS: 100 % color-bar	400 kHz sine wave with 25 kHz deviation	No signal	CTL
16:30 -	CR5-1B: 75 % color-bar CR5-1B PS: 100 % color-bar	400 kHz sine wave with 75 kHz deviation	No signal	CTL
17:00 -	CR5-1B: 50 % bowtie & 12.5T CR5-1B PS: 50 % bowtie & 10T	No signal	No signal	CTL
19:00 -	Line 17	No signal	No signal	CTL
22:00 -	Quad phase	No signal	No signal	CTL
24:00 -	Flat filed	No signal	No signal	CTL
26:00 -	CR5-1B: 75 % color-bar with Drop-out CR5-1B PS: 100 % color-bar with Drop-out	No signal	No signal	CTL
28:00 - 30:00	Composite V sweep with VISC	No signal	No signal	CTL

10. CR5-2A (SONY part No. 8-960-097-44): For analog Betacam, NTSC
CR5-2A PS (SONY part No. 8-960-098-44): For analog Betacam, PAL

Used for Betacam video adjustment of HDW-M/S, DVW-M and MSW-A/M series.

Time (min. : sec.)	Video	LAU tracks	CTL track
0:00 -	75 % color-bar	No signal	CTL
3:00 -	60 % multi-burst	No signal	CTL
6:00 -	CR5-2A: 50 % bowtie & 12.5T CR5-2A PS: 50 % bowtie & 10T	No signal	CTL
9:00 -	Pulse & Bar	No signal	CTL
11:00 -	Quad phase	No signal	CTL
13:00 - 15:00	Composite monoscope (Switching position is shifted.)	No signal	CTL

11. CR8-1A (SONY part No. 8-960-097-45): For analog Betacam, NTSC
CR8-1A PS (SONY part No. 8-960-098-45): For analog Betacam, PAL

Used for Betacam audio adjustment of HDW-M/S, DVW-M and MSW-A/M series.

Time (min. : sec.)	LAU tracks	CTL track	Video
0:00 -	1 kHz sine wave, 0 VU	CTL	No signal
2:55 -	No signal	CTL	No signal
3:00 -	10 kHz sine wave, −10 VU	CTL	No signal
4:55 -	No signal	CTL	No signal
5:00 -	1 kHz sine wave, −20 VU	CTL	No signal
5:55 -	No signal	CTL	No signal
6:00 -	40 Hz sine wave, −20 VU	CTL	No signal
6:25 -	No signal	CTL	No signal
6:30 -	7 kHz sine wave, −20 VU	CTL	No signal
6:55 -	No signal	CTL	No signal
7:00 -	10 kHz sine wave, −20 VU	CTL	No signal
7:25 -	No signal	CTL	No signal
7:30 -	15 kHz sine wave, −20 VU	CTL	No signal
7:55 -	No signal	CTL	No signal
8:00 - 10:00	1 kHz sine wave, 0 VU	1 kHz sine wave, 0 VU	No signal

12. CR8-1B PS (SONY part No. 8-960-096-86): For analog Betacam, PAL

Used for Betacam audio adjustment of HDW-M/S, DVW-M and MSW-A/M series.

Time (min. : sec.)	LAU tracks	CTL track	Video	AFM
0:00 -	1 kHz sine wave, 0 VU	CTL	No signal	No signal
2:55 -	No signal	CTL	No signal	No signal
3:00 -	15 kHz sine wave, 0 VU	CTL	No signal	No signal
4:55 -	No signal	CTL	No signal	No signal
5:00 -	1 kHz sine wave, –20 VU	CTL	No signal	No signal
5:55 -	No signal	CTL	No signal	No signal
6:00 -	40 Hz sine wave, –20 VU	CTL	No signal	No signal
6:25 -	No signal	CTL	No signal	No signal
6:30 -	7 kHz sine wave, –20 VU	CTL	No signal	No signal
6:55 -	No signal	CTL	No signal	No signal
7:00 -	10 kHz sine wave, –20 VU	CTL	No signal	No signal
7:25 -	No signal	CTL	No signal	No signal
7:30 -	15 kHz sine wave, –20 VU	CTL	No signal	No signal
7:55 - 8:00	No signal	CTL	No signal	No signal

1-21. Tools for Board Extension

For Large Plug-in Board

Description:	Extension board, EX-739
SONY part No.:	A-8324-911-A

For Connector Panel

Use the following boards and support to extend the connector panel.

For 124 pin relay

Description:	Relay board, EX-802
SONY part No.:	A-8325-508-A

For 100 pin relay

Description:	Relay board, EX-805
SONY part No.:	A-8325-509-A

For Connector panel

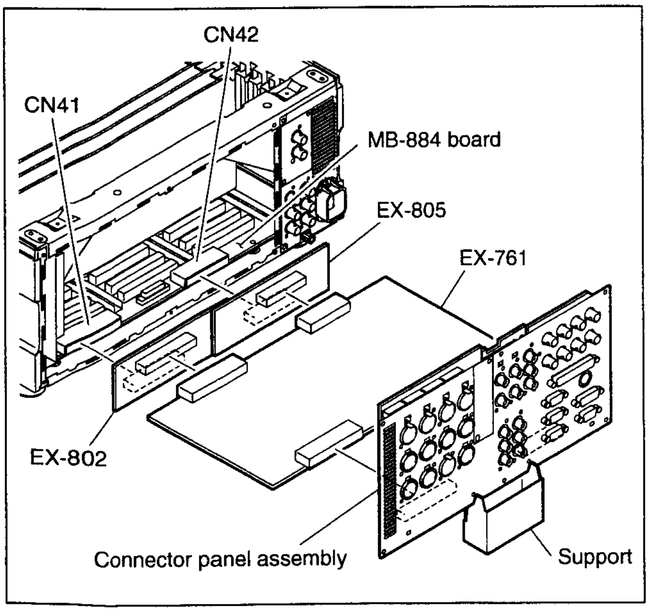
Description:	Extension board, EX-761
SONY part No.:	A-8325-510-A

For securing the connector panel

Description:	Support
SONY part No.:	3-205-709-01

Note

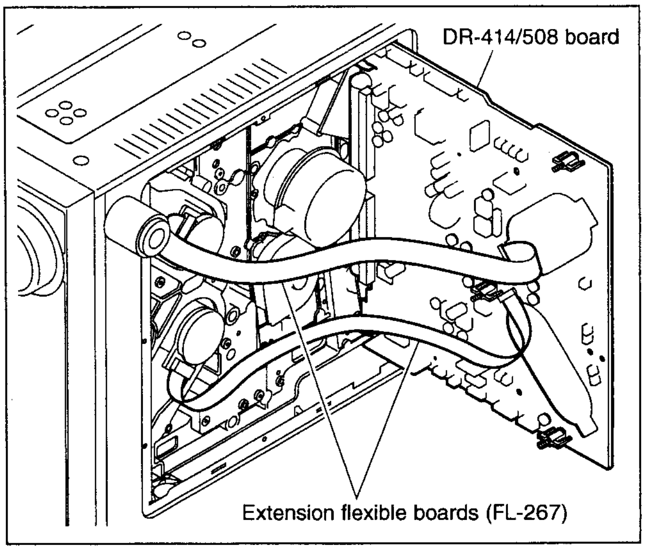
If the rubber feet of the VTR has been removed, insert a connector panel into the lower notch of the support.


CN42
CN41
MB-884 board
EX-805
EX-761
EX-802
Connector panel assembly
Support

For DR-414/508 Board

By replacing the flexible boards that are connected with DR-414/508 board and reel motors boards with the extension flexible boards, the maintenance operation can be easily performed at the DR-414/508 board is opened state.

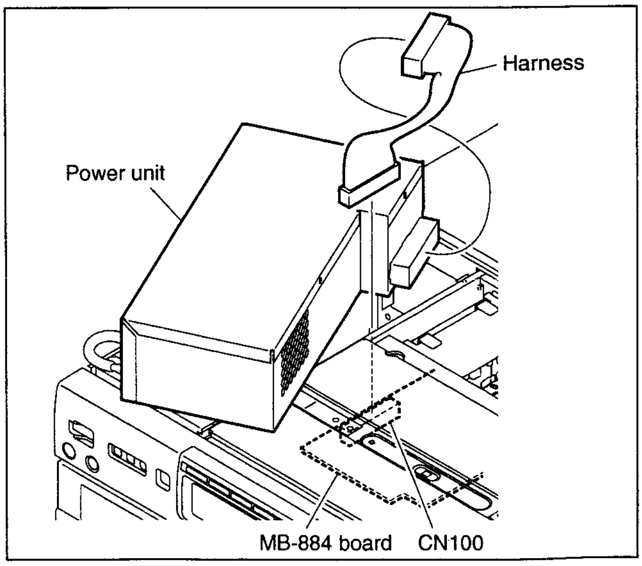
Description:	Extension flexible board (FL-276)
SONY part No.:	1-677-293-21


DR-414/508 board
Extension flexible boards (FL-267)

For Power Unit

When unplugging the power unit from the inside of the unit, use this extension harness.
Connect this extension harness between the power unit and MB-884 board.

Description:	Extension harness (DC OUT)
SONY part No.:	1-960-985-11


Harness
Power unit
MB-884 board
CN100

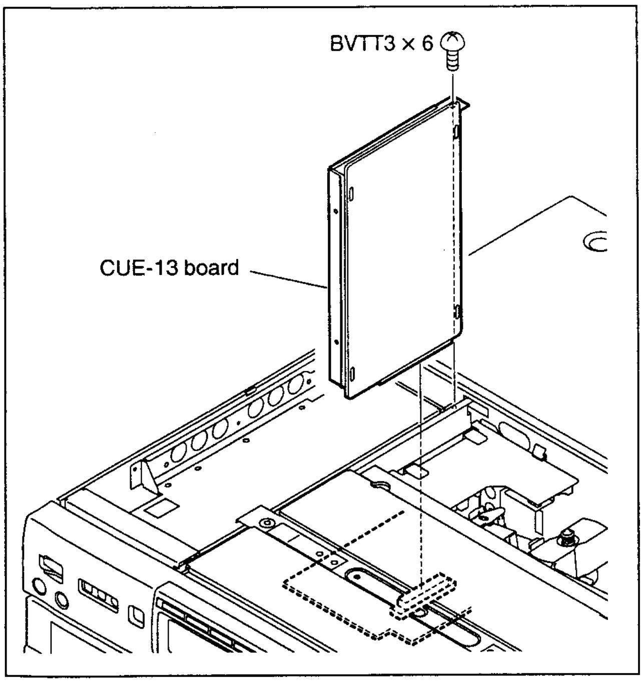
For CUE-13 board
(Not used in MSW-2000/A2000/A2000P)

Used for extending the CUE-13 board.

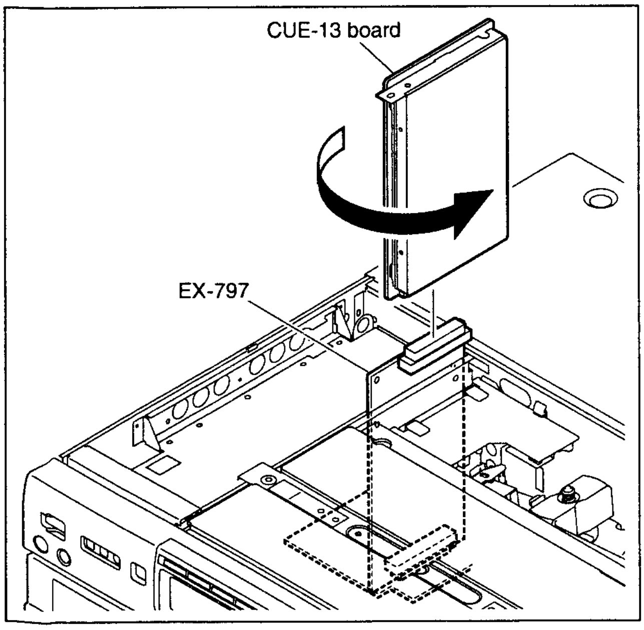
Description : Extension board, EX-797
SONY Part No. : A-8327-683-A

Extending procedure

(1) Remove one screw and remove the CUE-13 board.



(2) Attach the extension board (EX-797).
(3) Reverse the CUE-13 board as shown in the figure and attach to the extension board (EX-797).



1-22. PLCC IC Removal

It is recommended that the tool below is used to remove the PLCC-type IC inserted into an IC socket.

Tool required

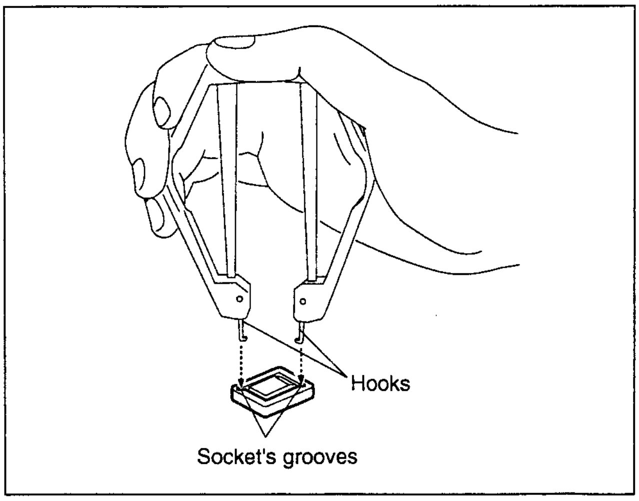
Description: IC extraction tool for PLCC socket
SONY Part No. J-6035-070-A
This tool can be used for IC whose pins number are 20 to 124.

Procedure

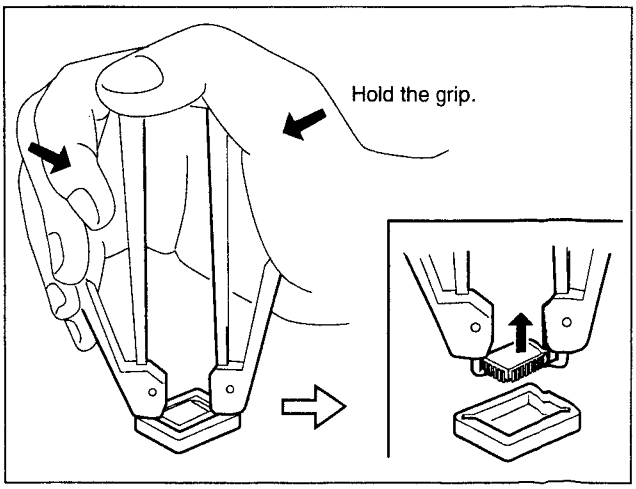
Notes

- Do not pull the IC upward using a hook of the extraction tool.
- Do not interpose the tool by excessive force.

1. Fit the tool's hooks in the grooves of IC socket.



2. Hold the grip as shown in the figure.
   Then holds IC with hooks, and removes it from the socket.
3. Lift up the tool softly with IC nipping.



1-23. Internal Video Test Signal

VTR has the internal video test signal generator.
There are two ways to generate the test signal with this generator.

- Setup extend menu
  ITEM-710 : INTERNAL VIDEO SIGNAL GENERATOR
  For detail, refer to the operation manual.
- Maintenance mode
  C21 : VIDEO TEST SG
  For detail, refer to "3-2-4. AUDIO/VIDEO Check Mode (C2)".

Describes output waveform figures of this generator below. These figures are drawn from waveforms that are watched COMPONENT OUT with the waveform monitor. They are measured with H rate and displayed with PARADE unless otherwise specified.

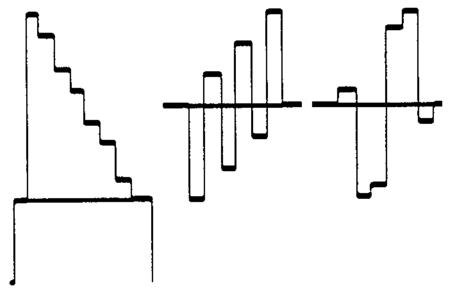
Note

In the 525 or 59.94 Hz mode, when selecting either D-1 format or Betacam format, set by the setup extend menu ITEM-709 : CAV LEVEL FORMAT, SUB-ITEM 1 : OUTPUT CAV LEVEL.
In the 625 mode have no Betacam format output.

SD video test signals

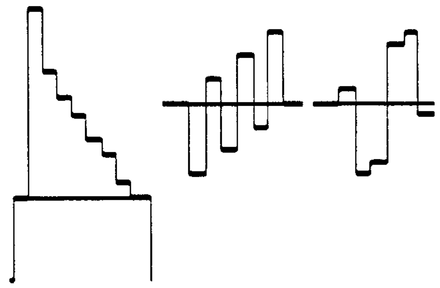
100% Color Bars

D-1 format

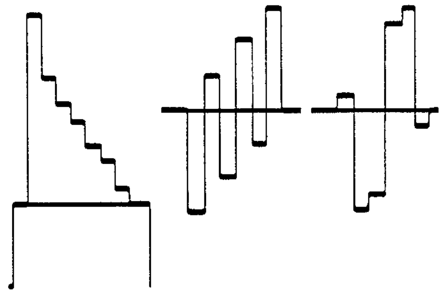


75% Color Bars

D-1 format

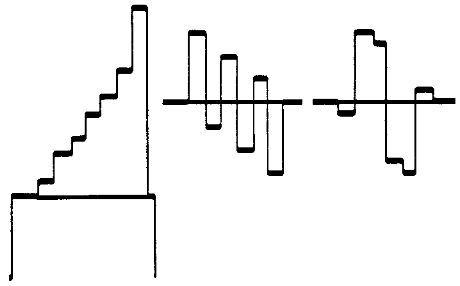


Betacam format

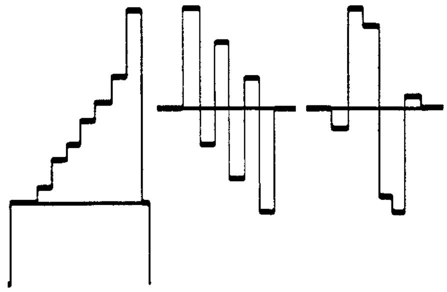


75% Reverse Color Bars

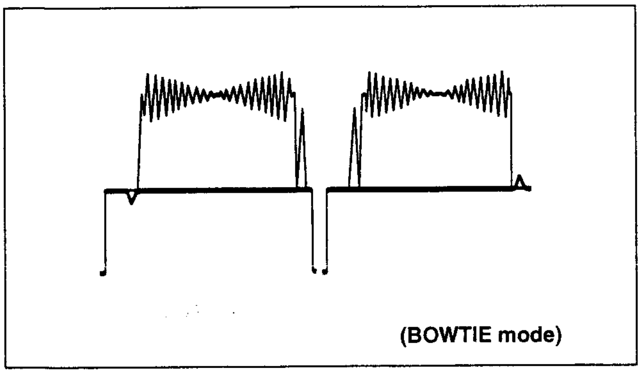
D-1 format



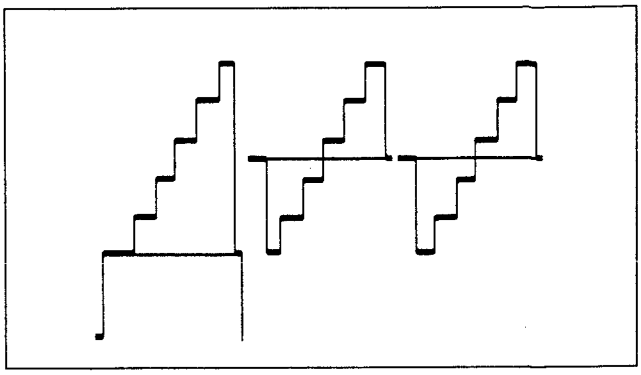
Betacam format (525/60 system only)



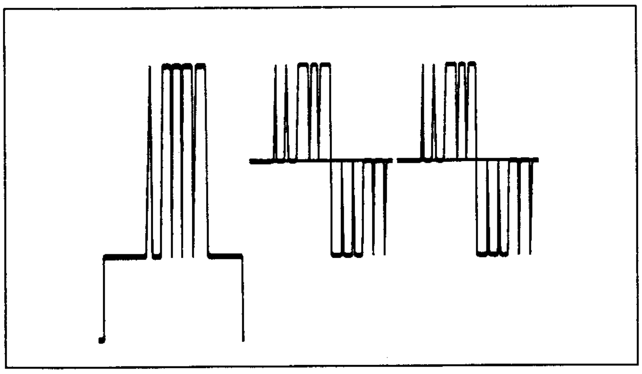
Bowtie



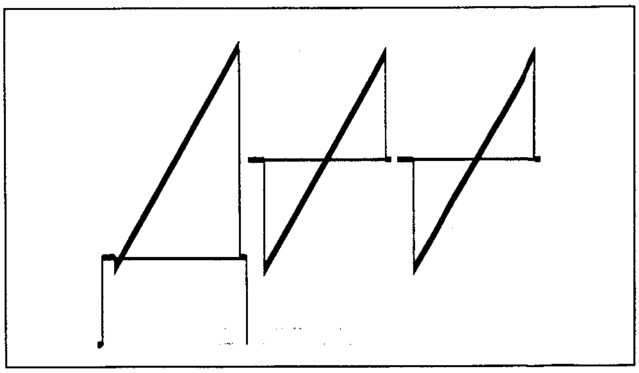
5 step



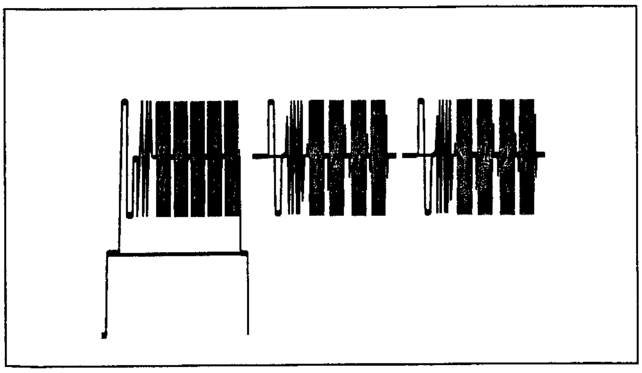
Pulse and Bar



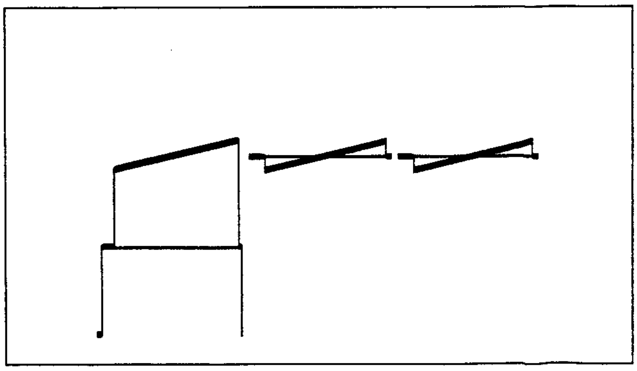
Ramp



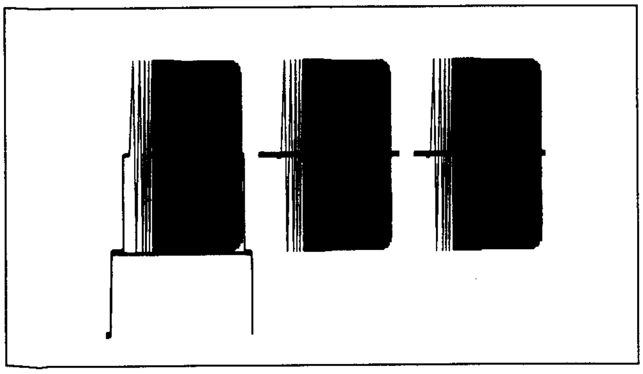
Multi Burst



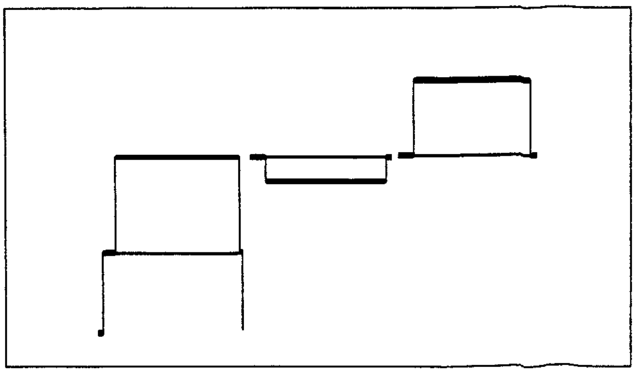
Shallow Ramp



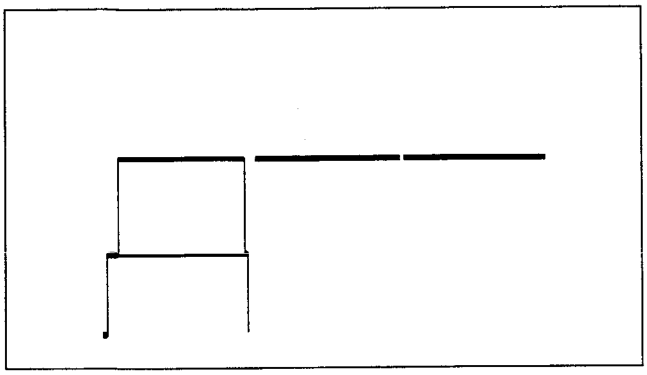
H Sweep



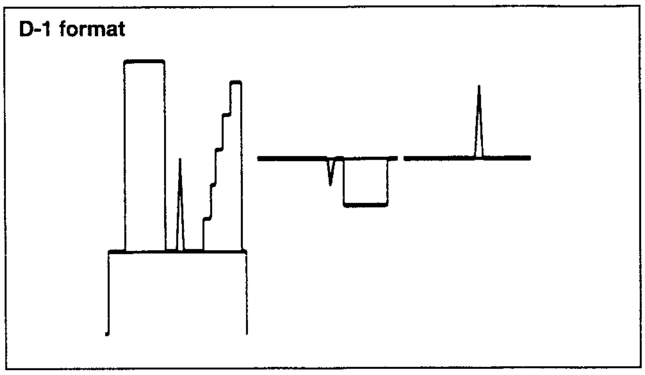
Red Signal



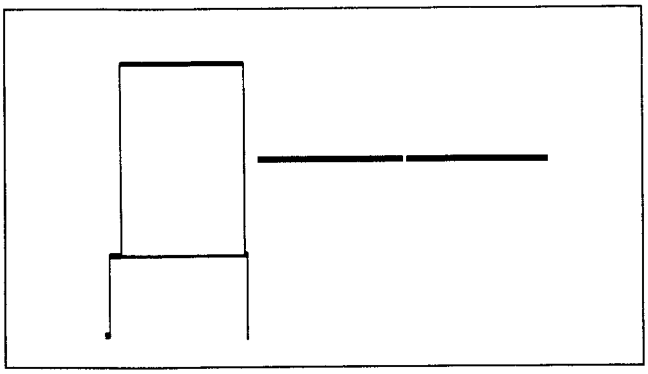
50% Flat

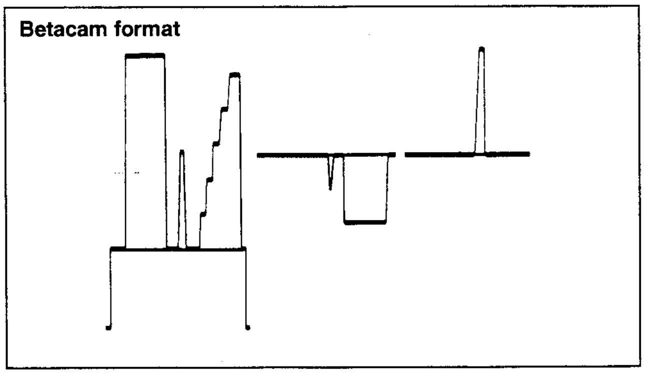


NTC7 (NTSC) (525 or 59.94 Hz mode only)

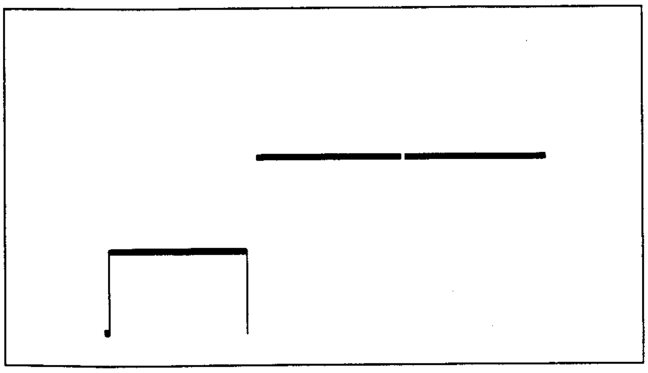


100% Flat

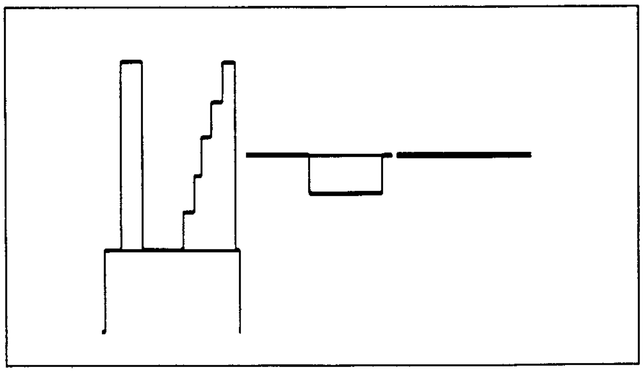



Betacam format

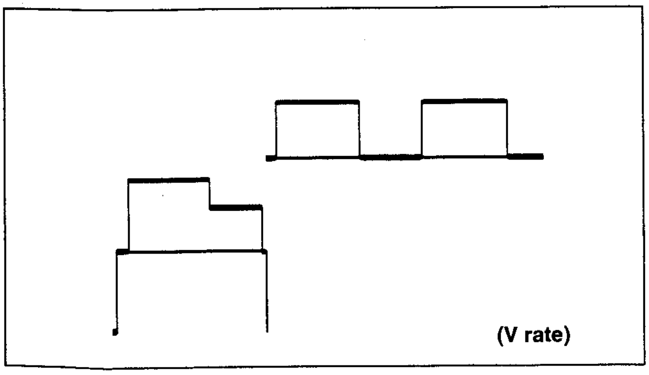
Black Burst



Line330 (625) (625 or 50 Hz mode only)

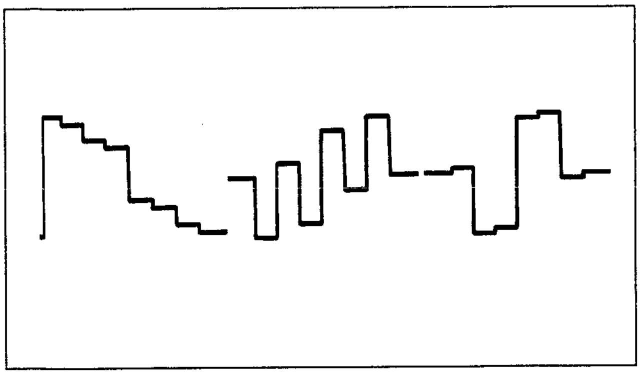


SDI Check Field

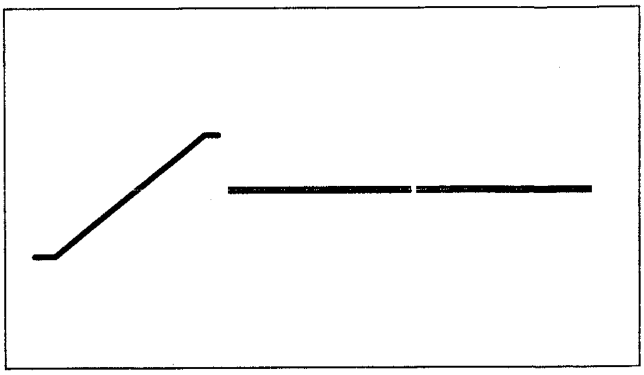


HD video test signals

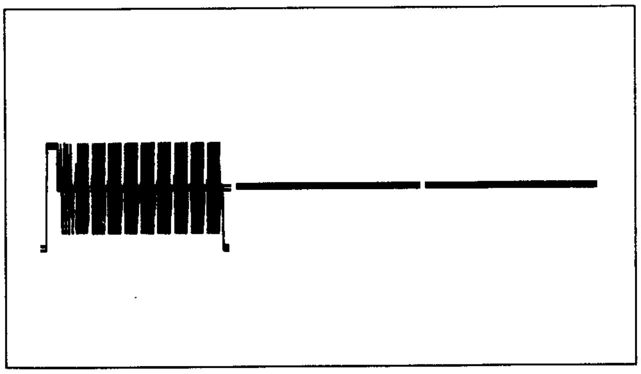
Color Bars



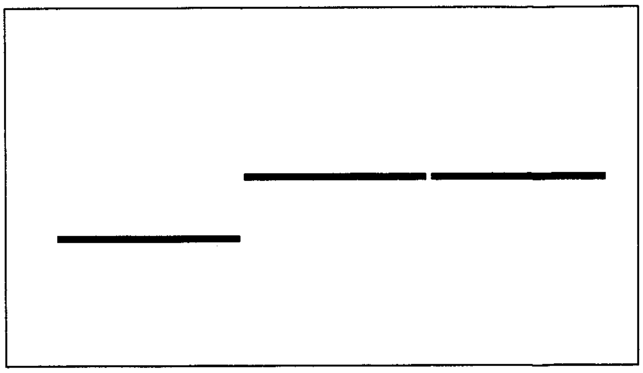
Ramp



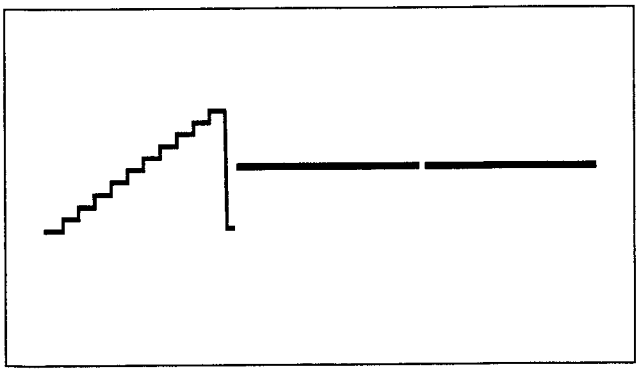
Multi Burst



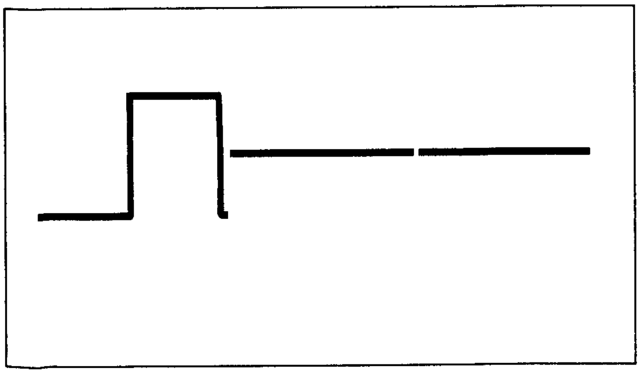
Black



10 steps



Pulse and Bar



1-24. Setup Menu (F-Series)

This section explains the F-series items on the setup menu which are for use during adjustment or maintenance.
For details on menu items other than F-series, refer to the operation manual supplied with the unit.

1-24-1. Menu Operation

Preparation

The menus for F-series items are usually not accessible at the factory setting for DVW and MSW series.
In DVW and MSW series, internal switch setting for the SS-89 board is required. (This switch is set to ON at the factory setting for HDW series.)

- S1502/SS-89 board: Bit-1 ⇨ ON (Displays the extended menu of the setup menu)

Activating the menu

1. Press the HOME button to display the HOME page at the menu display area.
2. Press the F5 (MENU) button to display the SETUP MENU at the menu display area.

Basic operation

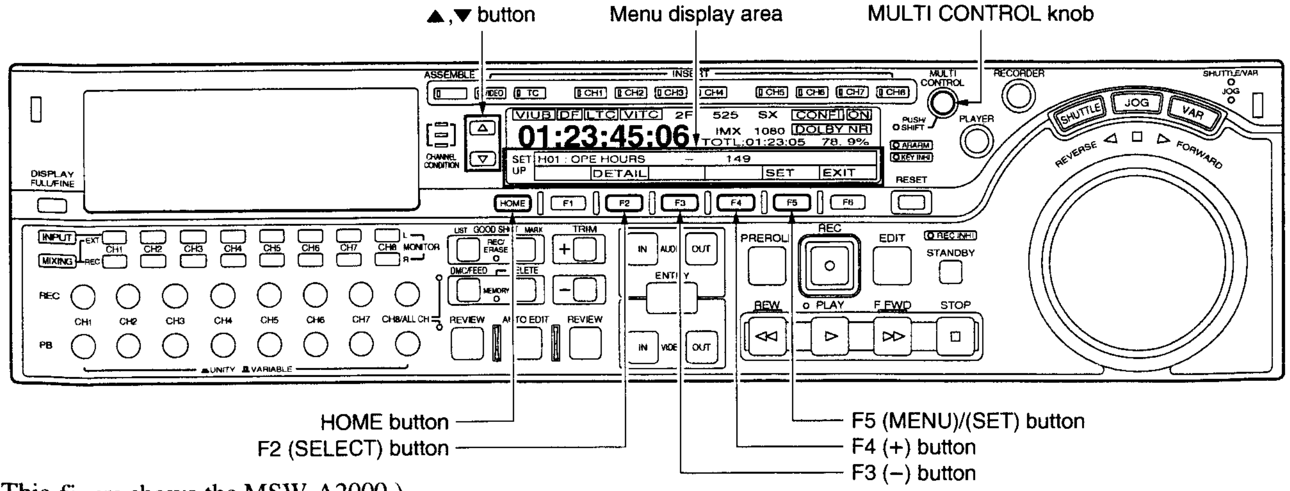
- **To select ITEM-F series**

  While pressing the HOME button, rotate the MULTI CONTROL knob and display the desired F series items to be selected at the menu display area.

  Note

  Use the ▲ and ▼ buttons to move the ITEM by category.
- **To change DATA**
  1. Push the F2 (SELECT) button.
  2. Push the F3 (−) button and F4 (+) button, or turn the MULTI CONTROL knob.
- **To enter the setting value**

  Press the F5 (SET) button.


▲,▼ button
Menu display area
MULTI CONTROL knob
01:23:45:06
H01 : OPE HOURS
DETAIL
SET
EXIT
HOME button
F2 (SELECT) button
F5 (MENU)/(SET) button
F4 (+) button
F3 (−) button

(This figure shows the MSW-A2000.)

1-24-2. F-Series Items

The F-series items contain the following items.

In the "Settings" column of the table, the factory default settings are indicated by an enclosing box.

Note

The $\boxed{\text{R}}$ marked setting is for recorder only.

No.	ITEM	Settings	Description
F01[*1]	AUDIO NR IN SP MODE	$\boxed{\text{ON}}$ SW	Turns on and off the Dolby NR when using a metal tape. ON: Dolby NR is turned on usually SW: Dolby NR switch is turned on and off depending on the F3 (DOLBY) setting of the function menu Page4. **Notes** • This item is used exclusively for analog Betacam longitudinal audio playback adjustment for 625/50 system. After adjustment is completed, return to the factory setting "ON". • When using an oxide tape, follows the F3 (DOLBY) setting regardless of the above setting.
F02	EMERGENCY TAPE PROTECTION	$\boxed{\text{ENA}}$ DIS	Selects whether emergency tape protection operation is enabled or not when VTR detects error in tape transport mechanism. ENA: Tape protection operation is enabled DIS: Tape protection operation is disabled **Note** This item is used exclusively for servo and mechanical adjustment. After adjustment is completed, return to the factory setting "ENA".
F13	TRACKING CONTROL VIA SEARCH DIAL	$\boxed{\text{OFF}}$ ON	Turns on and off the tracking control operation with search dial. OFF: Tracking control with the search dial is not activated ON: Tracking control becomes active when turning the search dial in PLAY mode **Note** This item is used exclusively for video tracking adjustment. After adjustment is completed, return to the factory setting "OFF".
$\boxed{\text{R}}$ F15	LTC INSERT FUNCTION	$\boxed{\text{LIMIT}}$ ALL	Determines tape format enables LTC recording (insert). LIMIT: Enables LTC recording only for tape format that can be recorded video and audio signals by this unit. ALL: Enables LTC recording for all tape formats that can be playing back by this unit.
F16	DEVICE TYPE MODIFY:0H	$\boxed{0}$ 1 | FFFF	Determines response data to 9-pin remote command DEVICE TYPE REQUEST (00h, 11h). 0: Returns the original device type data of the unit Except 0: Returns the set values as they are: The higher-order two digits are for DATA-1 The lower-order two digits are for DATA-2 **Note** Any selection of the above does not influence the whole VTR operation including TTP. If this item is set to values other than the factory setting "0", the operation of the unit is not ensured under the 9-pin remote command control.
F21	PROCESS CONT VR LOCAL ENABLE	$\boxed{\text{ON}}$ OFF	Selects whether the process control operation by the function menu, setup menu or BVR-50 connected with VIDEO CONTROL connector on the connector panel is enabled or not, when LOCAL DISABLE command is received through the 9-pin remote connector or the setup menu ITEM-006 : LOCAL FUNCTION ENABLE is set to "DIS" (all disable). ON: Above mentioned process control operation is enabled OFF: Above mentioned process control operation is disabled

[*1] : HDW-M, HDW-S, DVW-M and MSW series only

(Continued)

No.	ITEM	Settings	Description
R F25	SERVO/AV REF SEL IN PREREAD MODE	OFF ON	Selects the reference servo signal during pre-read operation. OFF: The setting of ITEM-309 is enabled. ON: The reference servo signal is set to forced EXT. (An external reference video input signal is used in this case.)
F34	STOP PINCH	ON OFF	Specifies STOP PINCH control. ON: In the STOP mode, the pinch roller will be kept pressed to the capstan shaft. OFF: In the STOP mode, the pinch roller will be distanced from the capstan shaft. **Notes** • Setting to ON enables video and audio playback to be started promptly and smoothly when transitioning from the STOP to PLAY mode. When the standby mode is cleared, the pinch roller will be distanced away from the capstan shaft. • When performing the editing at less than ±0.03 time speed using editor PVE-500, the STOP PINCH setting of the PLAYER side should be set to OFF.
R F35	AUDIO DITHER	ON OFF	Specifies how to process the data when audio input data is recorded. ON: Processes the audio input data to be recorded by a dither method. The result is rounded and recorded in 16 bits. OFF: The audio input data of less than 17 bits is rounded down and recorded. **Notes** • When one audio track pair among four or two is set to “data” using menu M372 : NON-AUDIO REC/PB of the maintenance menu, the dither method is turned OFF for all audio tracks irrespective of this ITEM setting. • Set “OFF” to record a signal accurately according to the input data (i.e., record a DOLBY AC-3 encoded signal).
F38	AUTO CUEUP IN TAPE STOP	OFF ON	Specifies the ON/OFF of the AUTO CUEUP function. OFF: The AUTO CUEUP function does not operate. ON: The AUTO CUEUP function operates. **Note** In the following cases, cue-up again to the current position stabilizes the start operation of playback when transitioning to the PLAY mode. • When the STOP or STILL state continues for more than 3 seconds. • When the STANDBY ON mode is set from the STANDBY OFF mode. • When recovering from the TENSION RELEASE state to TENSION ON. Set this setting to ON according to usage such as transmission.
F49*2	BIT RATE	50M 40M 30M	Sets bit rate for the compression at recording and the SDRI-CP output at IMX format playback. 50M : Bit Rate 50 Mbps 40M : Bit Rate 40 Mbps 30M : Bit Rate 30 Mbps **Notes** • When Composite, Component, or SDI is selected as input, it is recorded with the set bit rate on F49. When SDTI-CP is selected as imput, it is recorded with the bit rate of input MPEG stream. • When SDTI-CP is selected as input, if the bit rate of input MPEG stream exceeds the value set on the menu F49, “BitRate Conflict” blinks in the time data display area 2.
F50*2	CP RATE CNT	OFF ON	At IMX format playback, controls the bit rate of SDTI-CP output. OFF: Outputs with the recorded bit rate. ON: Outputs with the bit rate converted into the setting value on the menu F49.

*2 : For MSW series only

1-25. Service Action after Replacing or Repairing the Board

After replacing or repairing the mounted circuit board, be sure to perform the following adjustment or function check.
Moreover, if the SS-89 board has been replaced, settings must be checked.

Note

When using the maintenance mode, connect the VIDEO OUTPUT COMPOSITE 3 (SUPER) connector or SDI OUTPUT 3 (SUPER) connector to the video monitor.
(Refer to Section 3 for details of the maintenance mode.)

1-25-1. AE-31 Board

After replacing and repairing this board, perform the following adjustments according to the model.

HDW-M, HDW-S, DVW-M and MSW-M series:
Adjust the LAU playback system (Section 8-5-5) and CUE playback system (Section 8-5-7).

HDW-2000/D2000, DVW-2000/2000P:
Adjust the CUE system (Sections 8-5-7 and 8-5-8).

MSW-A2000/A2000P:
Adjust the LAU playback system (Section 8-5-5).

Note

This board is not mounted in MSW-2000.

1-25-2. APR-52 Board

After replacing and repairing this board, adjust the analog audio input/output system (Sections 8-5-3 and 8-5-4).

1-25-3. AU-272 Board

After replacing and repairing this board, adjust the LAU/AFM playback system (Sections 8-5-5 and 8-5-6).

Note

This board is not mounted in HDW-2000/D2000, DVW-2000 and MSW-2000.

1-25-4. CCM-15 Board

Note

As the mounted CCM-15 board is not a specified service part, it must be replaced together with the whole gear box assembly.

After replacing the gear box assembly, check that the threading motor operates normally using C012: THREADING in the maintenance mode.
(Refer to Section 3-2-2.)

1-25-5. CL-29 Board

After replacing and repairing this board, check that the cassette compartment moves up and down normally using C013: CASSETTE COMP. in the maintenance mode.
(Refer to Section 3-2-2.)

1-25-6. CP-350 Board

After replacing and repairing this board, perform the following checks (a or b).

a : For DVW and MSW recorder

b : For HDW series and MSW player series

Tools

- HD digital signal generator :
  TEKTRONIX TG700 or equivalent
- Analog composite video signal generator
  525/59.94 Hz: TEKTRONIX TSG-130A or equivalent
  625/50 Hz: TEKTRONIX TSG-131A or equivalent
- Analog component video signal generator:
  TEKTRONIX TSG-300 or equivalent
- Analog composite waveform monitor
  525/59.94 Hz: TEKTRONIX 1750A, or equivalent
  626/50 Hz: TEKTRONIX 1751A, or equivalent
- Analog component waveform monitor:
  TEKTRONIX WFM-300A or equivalent
- Analog component video monitor
  Used for displaying of the menu. Usually, connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
- 75 Ω terminators (4 pieces)

Preparation

The SS-89 board, S1502 (B-1), Bit-1 ⇨ ON (upper side)

a. Check (for DVW and MSW recorder)

1. Set the following function menu.

Page	Button	Customer Setting		Setting
HOME 1	F1 (VID.IN)	____________	⇨	COMPST
	F2 (PB/EE)	____________	⇨	EE
Page 4	F2 (OUTREF)	____________	⇨	REF
	F4 (CHARA)	____________	⇨	ON

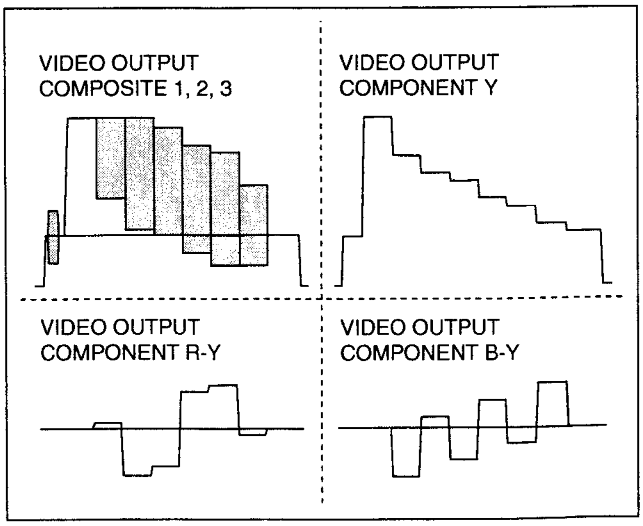
2. Check that the unit sets into the following mode.
   If it does not, change the setting of the setup menu.
   (Refer to the operation manual.)

Model	Mode	Setup menu
MSW-A2000/M2000	525	ITEM-013
MSW-A2000P/M2000P	625	(525/625 SYSTEM SELECT)

3. Set the setup extended menu as follows:

Menu No.	Custom setting		Setting
ITEM-105	____________	⇨	ON
ITEM-309	____________	⇨	AUTO1

4. Input the analog composite video signal (BB signal) to REF VIDEO connector (75 Ω switch: ON).
5. Check that the STOP button is not blinking.
6. Turn the F4 (CHARA) in function menu Page 4 to "OFF".
7. Input the 75 % color-bar signal (composite) to VIDEO INPUT COMPOSITE connector (75 Ω switch: ON).
8. Set the F2 (OUTER) in function menu Page 4 to "INPUT".
9. Check that the STOP button is not blinking.
10. Check that abnormality does not exist in the output signal from COMPOSITE 1/2/3 of VIDEO OUTPUT connectors using the composite waveform monitor.
11. Input the 75 % color-bar signal (D-1 format, component) to VIDEO INPUT COMPONENT connectors (Y/R-Y/B-Y).
12. Set the F1 (VID. IN) in function menu HOME to "Y, R/B".
13. Check that the STOP button is not blinking.
14. Check that abnormality does not exist in the output signal from COMPONENT Y/R-Y/B-Y of the VIDEO OUTPUT connectors using the component waveform monitor.
15. Set the F4 (CHARA) in function menu Page 4 to "ON".
16. Reset the setup extended menus ITEM-105 and ITEM-309 to the customer settings.
17. Reset the function menu settings changed for checking to customer settings.



Ex. 75 % Color-bar

b. Check (for HDW series and MSW player)

1. Set the following function menu.

Page	Button	Customer Setting	Setting
HOME 1	F2 (PB/EE)	____________	⇨ EE
Page 4	F2 (OUTREF)	____________	⇨ REF
	F4 (CHARA)	____________	⇨ ON

2. Check that the unit sets into the standard mode.
   If it does not, change the setting of the setup menu ITEM-013.
   (Refer to the operation manual.)
   NTSC model: 525 or 59.94 Hz mode
   PAL model: 625 or 50 Hz mode
3. Set the setup extend menu as follows:

Menu No.	Customer Setting	Setting
ITEM-105	____________	⇨ ON
ITEM-309	____________	⇨ AUTO1
ITEM-337*	____________	⇨ HD

* : HDW-2000, HDW-M series only

4. **For MSW player**
   Input the analog composite video signal (BB signal) to REF VIDEO connector (75 Ω switch: ON).
   For HDW series
   Input the three-valued bipolar external sync signal to REF.IN connector (75 Ω switch: ON).
5. Check that the STOP button is not blinking.
6. Turn the F4 (CHARA) in function menu Page 4 to "OFF".
7. **For Recorder only**
   Input HDSDI signal to the HDSDI INPUT connector.
8. **For Player only**
   Play back the following alignment tape.
   MSW-M2100/M2100E : MR5-1
   MSW-M2100P/M2100EP : MP5-1P
   HDW-M2100/M2100P : HR5-1A
9. Check that abnormality does not exist in the output signal from COMPOSITE 1/2/3 of VIDEO OUTPUT connectors using the composite waveform monitor.
10. Check that abnormality does not exist in the output signal from COMPONENT Y/R-Y/B-Y of the VIDEO OUTPUT connectors using the component waveform monitor.
11. Set the F4 (CHARA) in function menu Page 4 to "ON".
12. Reset the setup extended menus of step 3 to the custom settings.
13. Reset the function menu settings changed for checking to custom settings.

1-25-7. CP-351 Board

After repairing this board, perform the following checks (a or b).

a: For recorder
b: For player

Tools

- Audio signal generator:
  TEKTRONIX SG5010 or equivalent
- Audio analyzer:
  AUDIO PRECISION System One, System Two, or equivalent
- Time code generator:
  525/59.94 Hz: SONY BVG-1600 or equivalent
  625/50 Hz: SONY BVG-1600PS or equivalent
- Time code reader
  525/59.94 Hz: SONY BVG-1500 or equivalent
  625/50 Hz: SONY BVG-1500PS or equivalent

a. Check (for Recorder)

1. Set the audio CH1 to CH4 inputs to analog audio signal.

   Note

   Press each audio signal selection button (CH1 to CH4 buttons at upper portion) several times under the input signal selection mode to display ANA to the audio input signal indicator on the audio setting display section.

Channel	Input signal customer setting
CH1	☐ HDSDI*2 ☐ SDI ☐ SDTI ☐ AES/EBU ☐ ANA
CH2	☐ HDSDI*2 ☐ SDI ☐ SDTI ☐ AES/EBU ☐ ANA
CH3	☐ HDSDI*2 ☐ SDI ☐ SDTI ☐ AES/EBU ☐ ANA
CH4	☐ HDSDI*2 ☐ SDI ☐ SDTI ☐ AES/EBU ☐ ANA

*2 : HDW recorder only

2. Set the L channel monitor output to audio CH1 and R channel monitor output to audio CH2.

   Note

   Press the audio signal selection button (CH1 at upper, CH2 at lower) under the monitor signal selection mode to display L or R to the monitor channel indicator on the audio setting display section.

Channel	Monitor signal customer setting
L	☐ CH1 ☐ CH2 ☐ CH3 ☐ CH4 ☐ CH5*1 ☐ CH6*1 ☐ CH7*1 ☐ CH8*1
R	☐ CH1 ☐ CH2 ☐ CH3 ☐ CH4 ☐ CH5*1 ☐ CH6*1 ☐ CH7*1 ☐ CH8*1

*1 : MSW recorder only

3. Perform the following check for each channel (CH1 to CH4).
   (1) Set the analog audio input level switch to "600 Ω".
   (2) Input the audio signal of 1 kHz +4.0 dBm (600 Ω) to AUDIO INPUT connector from the signal generator.
   (3) Check that the audio level at AUDIO OUTPUT connector is 4.0 ±0.5 dBm by the audio analyzer.
   (4) Return the analog audio input level switch to the customer setting.
4. Connect the signal generator to the AUDIO INPUT CH1 connector, and input the audio signal 1 kHz, +4.0 dBm (600 Ω).
5. Check that the audio level at MONITOR OUTPUT L connector is 4.0 ±0.5 dBm by the audio analyzer.
6. Connect the signal generator to the AUDIO INPUT CH2 connector, and input the audio signal 1 kHz, +4.0 dBm (600 Ω).
7. Check that the audio level at MONITOR OUTPUT R connector is 4.0 ±0.5 dBm by the audio analyzer.
8. Connect the time code generator to TIME CODE IN connector, and the time code reader to TIME CODE OUT connector.
9. Set the function menu as follows:

Page	Key	Customer Setting	Setting
Page 1	F1 (TCG)	____________	⇨ EXT
	F2 (TCG)	____________	⇨ PRESET
	F6 (TCR)	____________	⇨ LTC

10. Check that the reader can read correctly the time code from the generator.
11. Reset the audio signal selection and function menu settings changed for checking to customer settings.

b. Check (for Player)

1. Set the L channel monitor output to audio CH1 and R channel monitor output to audio CH2.

   Note

   Press the audio signal selection button (CH1 at upper, CH2 at lower) under the monitor signal selection mode to display L or R to the monitor channel indicator on the audio setting display section.

Channel	Monitor signal customer setting
L	☐ CH1 ☐ CH2 ☐ CH3 ☐ CH4 ☐ CH5*1 ☐ CH6*1 ☐ CH7*1 ☐ CH8*1
R	☐ CH1 ☐ CH2 ☐ CH3 ☐ CH4 ☐ CH5*1 ☐ CH6*1 ☐ CH7*1 ☐ CH8*1

*1 : MSW player, HDW-2100/2100P only

2. Play back the following alignment tape.
   MSW-M2100/M2100E : MR5-1
   MSW-M2100P/M2100EP : MR5-1P
   HDW-M2100/M2100P : HR5-1A
3. Check that the audio level at AUDIO OUTPUT connector is 4.0 ±0.5 dBm by the audio analyzer.
4. Check that the audio level at MONITOR OUTPUT L connector is 4.0 ±0.5 dBm by the audio analyzer.
5. Check that the audio level at MONITOR OUTPUT R connector is 4.0 ±0.5 dBm by the audio analyzer.
6. Connect the time code generator to TIME CODE IN connector, and the time code reader to TIME CODE OUT connector.
7. Set the function menu as follows:

Page	Key	Customer Setting	Setting
Page 1	F6 (TCR)	______________	⇨ LTC

8. Check that the time code output from TIME CODE OUT connector can be read normally in the time code reader.
9. Reset the audio signal selection and function menu settings changed for checking to customer settings.

1-25-8. CP-371 Board

After replacing or repairing this board, perform the following checks.

Tools

- Equipment to input/output the AES/EBU signal:
  e.g. Another MSW-A2000, DNW-A75, DNW-75, DVW-A500

Note

In the case of AES/EBU input/output of the equipment is provided with four channels when checking the MSW series, perform the confirmation per four channels.

Checks

1. Set AUDIO CH1 to CH8 (CH5 to CH8 are MSW series only) inputs to AES/EBU signal.

   Note

   Press the audio signal selection button (CH1 to CH8 buttons at upper portion) several times under the input signal selection mode to display AES/EBU to the audio input indicator on the audio information display.

Channel	Input signal customer setting
CH1	☐ HDSDI*2 ☐ SDI*1 ☐ SDTI ☐ AES/EBU ☐ ANA
CH2	☐ HDSDI*2 ☐ SDI*1 ☐ SDTI ☐ AES/EBU ☐ ANA
CH3	☐ HDSDI*2 ☐ SDI*1 ☐ SDTI ☐ AES/EBU ☐ ANA
CH4	☐ HDSDI*2 ☐ SDI*1 ☐ SDTI ☐ AES/EBU ☐ ANA
CH5*1	☐ SDI*1 ☐ SDTI ☐ AES/EBU
CH6*1	☐ SDI*1 ☐ SDTI ☐ AES/EBU
CH7*1	☐ SDI*1 ☐ SDTI ☐ AES/EBU
CH8*1	☐ SDI*1 ☐ SDTI ☐ AES/EBU

*1 : MSW series only
*2 : HDW series only

2. Connect the equipment to output the AES/EBU signal to CH1/2, CH3/4, CH5/6 and CH7/8 (CH5 to CH8 are MSW series only) of AUDIO INPUT (AES/EBU) connectors.
3. Input the generated AES/EBU signal (1 kHz −20 dBFS) in the equipment to output the AES/EBU signal.
4. Check that the level meters of CH1 to CH8 (CH5 to CH8 are MSW series only) indicate −20 dBFS.
5. Disconnect the connection of step 2.
6. Connect the equipment to input the AES/EBU signal to CH1/2, CH3/4, CH5/6 and CH7/8 (CH5 to CH8 are MSW series only) of AUDIO OUTPUT (AES/EBU) connectors.
7. To generate the test signal, select "1KHz SINE 0VU" using C23 : AUDIO TEST SG in the maintenance mode. (Refer to Section 3-2-4.)
8. Check that the level of CH1 to CH8 (CH5 to CH8 are MSW series only) indicate −20 dBFS by the level meters of equipment to input the AES/EBU signal.
9. Perform A7 : VIDEO REMOTE (15P) in the maintenance mode. (Refer to Section 3-3-8.)
10. Exit the maintenance mode.

1-25-9. CUE-13 Board

After replacing and repairing this board, adjust the CUE system (Section 8-5-7 and 8-5-8).

Note

This board is not mounted in MSW-2000/A2000/A2000P.

1-25-10. DIF-134 Board

After replacing and repairing this board, adjust the SDTI system (Section 8-8).

Note

The mounted DIF-134H board (HKDW-102, optional board for HDW series) is not a specified service part. Place an order for HKDW-102 when replacing the DIF-134H board.

1-25-11. DIO-65 Board

Note

When replacing the DIO-65 board of P/No. suffix -A with suffix -B or later, be sure to replace the SE-606A board of P/No. suffix -A with suffix -B or later.

After replacing and repairing the DIO-65 board, adjust the Tele-File system (Section 8-11).

1-25-12. DM-123 Board

After replacing and repairing this board, adjust the analog Betacam video playback system (Section 8-7).

Note

This board is not mounted in HDW-2000/D2000, DVW-2000/P and MSW-2000.

1-25-13. DPR-155/229 Board

After replacing and repairing this board, check that audio and video can be recorded and played back normally to/from the cassette tape.

1-25-14. DPR-194/195/208 Board

After replacing and repairing this board, check that audio and video can be recorded and played back normally to/from the cassette tape.

1-25-15. DR-414/508 Board

After replacing this board and NV-RAM

1. Perform the servo/DT system adjustment.
   (Refer to Section 8-3.)
2. **MSW-M series only**
   Perform the GAUSS control level adjustment.
   (Refer to Section 8-7-8.)
3. Set the serial number using M31 : SERIAL NUMBER in the maintenance mode. (Refer to Section 3-5-3.)

After repairing this board (except for NV-RAM replacement)

1. Perform the servo/DT system adjustment.
   (Refer to Section 8-3.)
2. **MSW-M series only**
   Perform the GAUSS control level adjustment.
   (Refer to Section 8-7-8.)

1-25-16. DSP-109 Board

After replacing and repairing this board, check that the Proxy AV file can be transmitted normally via Ethernet.

Note

This board is not mounted in HDW series and DVW series.

1-25-17. DT-47 Board

After replacing and repairing this board, adjust the servo/DT system (Section 8-3).

1-25-18. DU-107 Board (Demagnetization Head)

After replacing this board, adjust the GAUSS control level (Section 8-7-8).

Note

This board is not mounted in HDW-2000/D2000, DVW-2000/P and MSW-2000/A2000/P.

1-25-19. EPR-1 Board

After replacing and repairing this board, check that audio and video can be recorded and played back normally to/ from the cassette tape.

Note

This board is not mounted in HDW series.

1-25-20. EQ-84 Board

Note

When inserting the EQ-84 board, do not allow the harness to contact the switch S1100 at the upper right of the board. If the unit is turned on with the switch S1100 is being pressed by the harness, the adjusted value of the EQ-84 board is initialized. Therefore, data are not correctly recorded and played back.
In this case, turn off the unit and route the harness properly. After turning on the unit again, the unit operates with the adjusted value.

After replacing and repairing this board, adjust the RF system (Section 8-4).

1-25-21. FP-133 Board

Before replacing this board

Perform the followings before replacing this board.

1. Check that the setup menu (main and extended menus) functions normally.
2. Save the settings of the setup menu into a Memory Stick. (Refer to Section 1-27 "Memory Stick (or Memory Card".)
   If the Memory Stick cannot be used, write down the setting contents of setup menu.

After replacing this board

After replacing this board, perform the following checks and settings.

Check the switches and panel functions

1. Turn off the power, and remove the connection cable and lower control panel. (Refer to Section 1-6 for removing the lower control panel.)
2. Connect the lower control panel to CONTROL PANEL connector on the connector panel with connection cable.
3. Set the following switches on the switch panel as follows.

Switch	Customer setting		Setting
PANEL SELECT	☐ FRONT ☐ REAR	⇨	REAR
KEY INHIBIT	☐ OFF ☐ ON	⇨	OFF

4. Turn on the power, and set all sub items of ITEM-118 of the setup extended menu to "DIS"

Sub item	Customer setting		
REMOTE SELECT	☐ DIS	☐ ENA	
AUDIO/F-KEY	☐ DIS	☐ ENA	
MODE CONTROL	☐ DIS	☐ EDIT	☐ ENA

5. Check the connected lower control panel functions normally.
6. Turn off the power, and disconnect the connection cable from the connector panel.
7. Connect the lower control panel to CONTROL PANEL connector on the switch panel with connection cable.
8. Set the PANEL SELECT switch on the switch panel to "FRONT".
9. Turn on the power, and check the connected lower control panel functions normally.
10. When the KEY INHIBIT switch on the switch panel is ON, check the lower control panel does not function.
11. Set the KEY INHIBIT switch on the switch panel to OFF.
12. Reset all sub items of ITEM-118 of the setup extended menu and switch setting on the switch panel to customer settings.
13. Attach the lower control panel to the original position of the unit, and fix the connection cable with clamp.

Resetting data

1. Reset the several settings of the setup menu using M49 : RESET ALL SETUP in the maintenance mode.
2. Set again the settings of the setup menu (main and extended menus) saved in step 2 of "Before replacing this board".
3. Clear the error logger using error logger display mode (M2) in the maintenance mode. (Refer to Section 3-4-2.)
4. Set the calendar/clock using the error logger display mode (M2) in the maintenance mode.
(Refer to Section 3-4-3.)
5. Reset the headroom of the audio level meter using M370 : METER HEADROOM in the maintenance mode. (Refer to Section 3-5-6.)
6. Reset the 15-pin video remote unity level data using A7 : VIDEO REMOTE (15P) in the maintenance mode. (Refer to Section 3-3-8.)
7. Reset the input/output pin of the 50-pin remote interface (REMOTE 2 connector) using M39 : 50 PIN DATA ASIGN in the maintenance mode if possible. (Refer to Section 3-5-8.)
8. Reset the ISR setting data using M32 : RS-232C STATUS in the maintenance mode if possible.

After replacing the NV-RAM

Perform the service action after replacement referring to "Section 1-18. NV-RAM".

After repairing this board (except for NV-RAM replacement)

1. Reset the 15-pin video remote unity level data using A7 : VIDEO REMOTE (15P) in the maintenance mode. (Refer to Section 3-3-8.)
2. Perform M3E0 : STICK TO ROM of the maintenance mode, and check the Memory Stick can be read.

1-25-22. FP-134 Board

After replacing and repairing this board, perform M3F0 : CARD TO ROM of the maintenance mode, and check the IC memory card can be read.

Note

This board is not used in HDW-D2000/S2000, DVW series and MSW-2000/M2000E/M2000EP/M2100E/M2100EP.

1-25-23. HIF-1 Board

After replacing and repairing this board, adjust the digital video system (Section 8-9).
Then perform the following check.

Note

As the mounted HIF-1B board (BKMW-104, optional board for DVW series, MSW series) is not a specified service part.
Place an order for BKMW-104 when replacing the HIF-1B board.

Tools

- HD digital video signal generator:
  TEKTRONIX TG700 (with optional HD VG7) or equivalent
- HD digital input monitor:
  SONY BVM-D14 (with optional BKM-142HD) or equivalent

Check (for HDW-2000/D2000/M2000/P/S2000/P)

1. Set the F1 (VID. IN) in function menu HOME 1 to "SDI".
(VID. IN customer setting : ________________)
2. Input the HD digital video signal to HDSDI INPUT connector from the HD digital video signal generator.
3. Check that no abnormality exists in the picture watching the video monitor connected to each HDSDI OUTPUT connector. (INPUT MONITOR, 1, 2, and 3)
4. Reset the F1 (VID. IN) in function menu HOME 1 to customer setting.

Check (for HDW-M2100/P) (DVW/MSW series with BKMW-104)

1. Make C21 : VIDEO TEST SG in the maintenance mode generate the 100 % color bars signal. (Refer to Section 3-2-4.)
2. Check that no abnormality exists in the picture watching the video monitor connected to each HDSDI OUTPUT connector. (1, 2, 3)

1-25-24. HN-268 Board

After replacing and repairing this board, check that the pinch solenoid moves normally using C020: PINCH ROLLER in the maintenance mode.
(Refer to Section 3-2-2.)

1-25-25. HP-101 Board

After replacing or repairing this board, check the PHONES control functions normally as the following steps.

1. Turn the PHONES control fully counterclockwise.
2. Connect the headphones to the PHONES jack.
3. Generates the test signal (1 kHz Sine) using C23 : AUDIO TEST SG in the maintenance mode.
   (Refer to Section 3-2-4.)
4. Turn the PHONES control, check that the audio level heard from the headphones varies according to the PHONES control position.

1-25-26. HPR-1 Board

After replacing and repairing this board, adjust the recording current. (Refer to Section 7-2-7.) And then check that the audio and video can be recorded/played back normally to the cassette tape.

Note

This board is not mounted in DVW series and MSW series.

1-25-27. IF-885 Board

After replacing and repairing this board, check the Ethernet connection.

1-25-28. IF-886 Board

After replacing and repairing this board, check that files can be transferred and received via Ethernet normally.

1-25-29. KY-464/465/569/570 Board

After replacing the board, check that the switches and indicators function normally.

1-25-30. LED-357 Board

Check that when cassette tapes recorded in a certain format is loaded, the corresponding format indicator lights up.

1-25-31. LP-81 Board

After replacing and repairing this board, check the followings.

1. When a cassette tape is loaded, the cassette compartment operates normally.
2. When a cassette tape is loaded, all cassette compartment LEDs light up.

1-25-32. MB-884 Board

After replacing and repairing this board, check that this unit operates normally.

1-25-33. PC-70 Board

Note

As the mounted PC-70 board is not a specified service part, it must be replaced together with the whole cassette compartment assembly.

After replacing the cassette compartment assembly, check the following.

1. Check that the cassette compartment is operating normally using C013: CASSETTE COMP. in the maintenance mode. (Refer to Section 3-2-2.)
2. Check that the cassette size sensor and cassette-in sensor of the cassette compartment are operating normally using C001: CASSETTE COMP. SW in the maintenance mode. (Refer to Section 3-2-2.)

1-25-34. PTC-101 Board

Note

As the mounted PTC-101 board is not a specified service part, it must be replaced together with the whole dial assembly.

After replacing the dial assembly, check that the dial operates normally in the jog mode and shuttle mode.

1-25-35. PTC-102 Board

Note

As the mounted PTC-102 board is not a specified service part, it must be replaced together with the whole gear box assembly.

After replacing the gear box assembly, check that the threading motor operates normally using C012: THREADING MOTOR in the maintenance mode.
(Refer to Section 3-2-2.)

1-25-36. PTC-99 Board

Note

As the mounted PTC-99 board is not a specified service part, it must be replaced together with the whole MC sensor assembly.

After replacing the MC sensor assembly, check that the cassette tab sensor functions normally using C000: CASSETTE SW in the maintenance mode.
(Refer to Section 3-2-2.)

1-25-37. RC-89 Board

Check that the audio can be recorded/played back normally to the cassette tape after replacing and repairing this board.

Note

This board is not mounted in DVW series and MSW series.

1-25-38. RX-80 Board

Notes

- Since a high frequency circuit is mounted on the RX-80 board, replacement of electrical parts and adjustment of boards are impossible.
  Be sure to replace the whole board when the RX-80 board is malfunctioning.
- The RX-80 board cannot be used with the HIF-1 board with the suffix -21 or less.
- This board is not used in HDW-M2100/P, DVW series and MSW series.

After replacing this board, check that the audio and video are recorded/played back normally to the cassette tape.

1-25-39. SDI-52 Board

Note

As the mounted SDI-52 board is not a specified service part, it must be replaced together with the VPR-64 board for HDW series and MSW series or the VPR-91 board for DVW series.

After replacing the board

Perform the SDI I/O line adjustment (Section 8-8).
Then perform the following check.

Tools

- Digital component video signal generator:
  TEKTRONIX TSG-422 option-1S or equivalent
- Video monitor for the serial digital input
  525 mode: SONY BVM-1311 (with optional BKM-2085-14) or equivalent
  625 mode: SONY BVM-1411 (with optional BKM-2085-14) or equivalent

Check (for DVW and MSW recorder)

1. Set the F1 (VID. IN) in function menu HOME 1 to "SDI".
   (VID. IN customer setting : ________________)
2. Input the 4:2:2 component digital video signal to SDI INPUT connector from the digital component video signal generator.
3. Check that no abnormality exists in the picture watching the video monitor connected to each SDI OUTPUT connector. (active through out, 1, 2, and 3)
4. Reset the F1 (VID. IN) in function menu HOME 1 to customer setting.

Check (for HDW series and MSW player)

1. Generate the test signal (100 % color bars) in maintenance mode C21 : VIDEO TEST SG of this unit.
   (Refer to Section 3-2-4.)
2. Connect the video monitor to SDI OUTPUT connector (1, 2, 3) and check no error appears in the picture.

1-25-40. SDI-63 Board

Notes

- Since a high frequency circuit is mounted on the SDI-63 board, replacement of electrical parts and adjustment of boards are impossible.
  Be sure to replace the whole board when the SDI-63 board is malfunctioning.
- This board is not used in DVW series.

After replacing this board, check that the audio and video are recorded/played back normally to the cassette tape.

1-25-41. SE-606A Board

Note

When replacing the SE-606A board of P/No. suffix -A with suffix -B or later, be sure to replace the DIO-65 board of P/No. suffix -A with suffix -B or later.

After replacing and repairing the SE-606A board, adjust the Tele-File system (Section 8-11).

1-25-42. SS-89 Board

When replacing:

When replacing this board, check that the DIP switches S101 and S1502 are set as the factory setting referring to Section 1-14. Moreover set S1501 as factory setting referring to Section 1-14.

After replacing/repairing the board

After replacing and repairing this board, perform the following adjustmens according to the model.

MSW-2000/A2000/P:

Perform the servo/DT system adjustment (Section 8-3).

Other models:

Perform the servo/DT system adjustment (Section 8-3) and CUE meter offset adjustment (Step 6 in Section 8-5-7).

1-25-43. SWC-40/SW-1106 Board

After replacing and repairing this board, check that the switches and indicators function normally.

1-25-44. TC-104 Board

After replacing and repairing this board, adjust the LTC system and full-erase current (Section 8-10).

1-25-45. TR-119 Board

Note

As the mounted TR-119 board is not a specified service part, it must be replaced together with the whole S tension regulator assembly.

After replacing the S tension regulator assembly, check and adjust tape running (Section 6-6).

1-25-46. TR-120 Board

Note

As the mounted TR-120 board is not a specified service part, it must be replaced together with the whole T tension regulator assembly.

After replacing the T tension regulator assembly, check and adjust tape running (Section 6-6).

1-25-47. TX-96 Board

Notes

- Since a high frequency circuit is mounted on the TX-96 board, replacement of electrical parts and adjustment of boards are impossible.
  Be sure to replace the whole board when the TX-96 board is malfunctioning.
- The TX-96 board cannot be used with the HIF-1 board with the suffix -21 or less.

After replacing this board, check that the audio and video are recorded/played back normally to the cassette tape.

1-25-48. VN-13 Board

After replacing and repairing this board, check the followings:

1. Check the following LEDs:
   D101, D901 : Lights for one second after powered on, and then powered off (board number suffix -11)
   D102 (CPU) : Blinks in five seconds
2. Check that files can be transferred and received via Ethernet normally.

Note

This board is not used in HDW series and DVW series.

1-25-49. VPR-64/91 Board

After replacing and repairing this board, adjust the video system (Section 8-6) and SDI system (Section 8-8).
Then perform the following check.

Tools

- Digital component video signal generator:
  TEKTRONIX TSG-422 option-1S or equivalent
- Video monitor for the serial digital input
  525/60 system: SONY BVM-1311 (with optional BKM-2085-14) or equivalent
  625/50 system: SONY BVM-1411 (with optional BKM-2085-14) or equivalent

Check (for HDW series and MSW player)

1. Generate the test signal (100 % color bars) in maintenance mode C21 : VIDEO TEST SG of this unit. (Refer to Section 3-2-4.)
2. Connect the video monitor to SDI OUTPUT connector (1, 2, and 3) and check no error appears in the picture.

Check (for DVW and MSW recorder)

1. Set the F1 (VID. IN) in function menu HOME 1 to "SDI".
   (VID. IN customer setting : ________________)
2. Input the 4:2:2 component digital video signal to SDI INPUT connector from the digital component video signal generator.
3. Check that no abnormality exists in the picture watching the video monitor connected to each SDI OUTPUT connector. (active through out, 1, 2, and 3)
4. Reset the F1 (VID. IN) in function menu HOME 1 to customer setting.

1-25-50. VR-262/300 Board

After replacing the board, check that the each control functions normally.

1-26. ISR

Overview

This unit corresponds to ISR (Interactive Status Reporting) function. When this unit is connected to the personal computer which activates Sony's ISR application software, the status of this unit or the contents of a generated error can be intensively monitored and managed on the monitor screen of a personal computer. The data displayed on the monitor screen can be stored as a file.

Note

As for ISR application software, method of using or installing the personal computer which can use this software, and the method of concrete operating, refer to ISR protocol manual.
For obtaining it, contact your local Sony Sales Office/ Service Center.

The major functions are as follows:

Monitor Functions

- Error code and error message (Refer to Section 2.)
- Display of operation status (Equivalent to the display on the video monitor.)

Management Functions

- Model name, serial No., destination
- ROM versions

Indicating item	Description
Manufacture	Displayed as SONY.
Model name	Displays the model name.
Serial No.	Displays the serial No.
Device ID	Can give an arbitrary name to this unit and register it.
Destination	Displays the destination. J (For Japan), SYL (For Overseas)
ROM	Displays the information of the ROMs mounted in this unit.

Inspection Functions

- Hours meter (Equal to hours meter of the setup menu)
- Error logger

1-27. Memory Stick (or Memory Card)

The Memory Stick or memory card can be used to save and read the setup menu, and update internal software from the maintenance mode. (The standard component of HDW-D2000/S2000/S2000P, DVW series and MSW-2000/ M2000E/M2000EP/M2100E/M2100EP is only Memory Stick function.)

- Memory Stick (8, 16, 32, 64, 128 MB)
  MSA-8AN (8 MB)
  MSA-16AN (16 MB)
  MSA-32AN (32 MB)
  MSA-64AN (64 MB)
  MSA-128A (128 MB)
- Memory card (2 MB or 4 MB)
  MB98A81183 (For 2 MB): 1-772-003-11
  MB98A81273 (For 4 MB): 1-772-004-11

  Notes
  - Other than the above, flash memory cards available separately can be used. (conforming to 5V single power JEIDA/PCMCIA, Fujitsu or AMD types, etc.)
  - The M3F : MEMORY CARD UTILITY in the maintenance menu is displayed only when the memory card is inserted in the unit.

Formatting the Memory Stick (or Memory Card)

Format the Memory Stick (or memory card) to be used in this unit to the MS-DOS format first.
All data will be erased when formatted.

1. Insert the Memory Stick (or memory card) into the exclusive slot of the switch panel of this unit.
2. Enter the maintenance mode.
3. **For Memory Stick:**
   Execute M3E2 : FORMAT STICK. (Refer to Section 3-5-11.)
   For memory card:
   Execute M3F2 : FORMAT CARD.

Saving/Reading the Setup Menu

The current settings can be saved on the Memory Stick (or memory card) before changing the settings of the setup menu temporarily during maintenance of the unit, etc. After completing the maintenance, the contents can be downloaded and easily returned to the original settings.

Saving Setup Menu Settings

1. Insert a formatted Memory Stick (or memory card) with available space into the exclusive slot of the unit.
2. Enter the maintenance mode.
3. **For Memory Stick:**
   Execute M3E2 : FORMAT STICK. (Refer to Section 3-5-11.)
   For memory card:
   Execute M3F1 : ROM TO CARD.
4. Execute U3 : SETUP MENU UPLOAD.

Downloading Saved Data

1. Insert a Memory Stick (or memory card) with setup menu settings saved into the exclusive slot of the unit.
2. Enter the maintenance mode.
3. **For Memory Stick:**
   Execute M3E2 : FORMAT STICK. (Refer to Section 3-5-11.)
   For memory card:
   Execute M3F0 : CARD TO ROM.
4. Execute D3 : SETUP MENU DOWNLOAD.

Saving/Reading the MCF data (for DVW/MSW series)

The current settings can be saved at a time on the Memory Stick (or memory card) before changing the following data temporarily during maintenance of the unit, etc.
After completing the maintenance, the saved data can be downloaded and easily returned to the original settings.

- Setting data of the setup menu
- Data recorded on “SETUP BANK4” (Refer to Section 3-6-3.)
- Customized data of the setup menu (Refer to Section 1-28.)

These are collectively called “MCF data”.

Saving MCF data

1. Insert a formatted Memory Stick (or memory card) with available space into the exclusive slot of the unit.
2. Enter the maintenance mode.
3. **For Memory Stick:**
   Open the M3E1 : ROM TO STICK menu. (Refer to Section 3-5-11.)
   For memory card:
   Open the M3F1 : ROM TO CARD menu.
4. Execute U4 : MCF UPLOAD.

Downloading the saved MCF data

1. Insert the Memory Stick (or memory card) storing the MCF data into the exclusive slot of the unit.
2. Enter the maintenance mode.
3. **For Memory Stick:**
   Open the M3E0 : STICK TO ROM menu. (Refer to Section 3-5-11.)
   For memory card:
   Open the M3F0 : CARD TO ROM menu.
4. Execute D4 : MCF DOWNLOAD.

Note

The SY software version used during downloading the MCF data with MCF DOWNLOAD must be the same as that used during upload by using U4 : MCF UPLOAD in the M3E1 : ROM TO STICK or M3F1 : ROM TO CARD menu.
If the versions used during upload and download do not match, a message “Ver.(SY) do not match!”, “PUSH EXIT BUTTON” is displayed, disabling download of the MCF data.

Updating the Software

Note

A Memory Stick (or memory card) with the new version software is required for updating the software.
Please contact your local Sony Sales Office/Service Center to memorize the updating software.

It is possible to update the following incorporated software.
The time required for downloading the software is about 40 seconds.

SY : System control ROM (IC1103/SS-89 board)
SV : Servo control ROM (IC107/SS-89 board)

For Memory Stick:
Perform using M3E0 : STICK TO ROM of the maintenance mode. (Refer to Section 3-5-11.)
For memory card:
Perform using M3F0 : CARD TO ROM of the maintenance mode.

Note

Be sure to use the 2 MB memory card.

1-28. Customizing display of setup menu items

A desired item can be selected from the setup menu in the setup menu customize mode.

Note

When bit-1 of switch S1502 on the SS-83 board is OFF, extended menu items are not displayed in the setup menu irrespective of the setup menu customization. This switch setting is valid for display in the setup menu customize mode.
When bit-1 of the switch is ON, it can be set whether to display extended menu items or not for each item in the setup menu customize mode.

Preparation for operation

The setup menu display cannot be customized as factory shipping. The following switch setting is necessary on the SS-89 board.
S1502/SS-89 board: Bit-6 → ON
(To enable access to the setup menu customize mode)

Executing the setup menu

1. Press the HOME button to display the HOME page.
2. Keep pressing the F5 (MENU) button until the setup menu customize mode is displayed.
   The setup menu is displayed first when the F5 button is pressed, but the setup menu customize mode is displayed after three seconds or so.

Setup menu display screen

Display of the setup menu customize mode is the same as that of the setup menu except for the following differences.

- The screen display is reversed (black characters on the white background).
- "SETUP CUSTOMIZE" is displayed on the top line.
- Though same items as the setup menu are displayed, only "on" or "off" is allowed for selection and the sub-items are not displayed.

Basic operation

Set "on" or "off" for each displayed item.

on: Displayed in the setup menu.

off: Not displayed in the setup menu.

- To select an item:

  Turn the MULTI CONTROL knob to display a desired item in the menu display area.

  Note

  Press the ▲ or ▼ button to move items on a category basis.

- To modify the data:
  1. Press the F2 (SELECT) button.
  2. Press the F3 (−)/F4 (+) button or turn the MULTI CONTROL knob.

- To set the data:

  Press the F5 (SET) button.

  Note

  To return to the item selection screen for another selection and setting, press the F1 (RETURN) button.

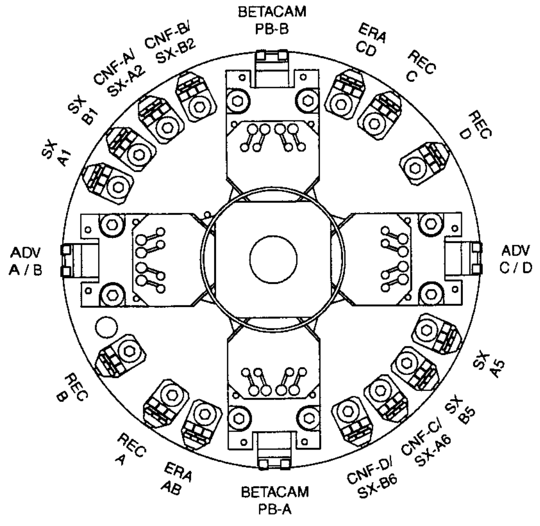
1-29. Video Head Location

This section describes the video head locations and tape formats which can be recorded and played back for each model.

Model	HDW-					DVW-		MSW-			
	2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P M2000E M2000EP	M2100 M2100P M2100E M2100EP
	Recorder				Player	Recorder		Recorder			Player
Video head location	Fig ③	Fig ③	Fig ①	Fig ①	Fig ②	Fig ③	Fig ①	Fig ④	Fig ①	Fig ①	Fig ②
Recording format	HD	HD	HD	HD	—	DB	DB	IMX	IMX	IMX	—
Playing back format	HD — — — —	HD DB IMX — —	HD DB IMX SX AB	HD — — SX AB	HD DB IMX SX AB	— DB — — —	— DB IMX SX AB	— — IMX SX —	— — IMX SX AB	— DB IMX SX AB	— DB IMX SX AB

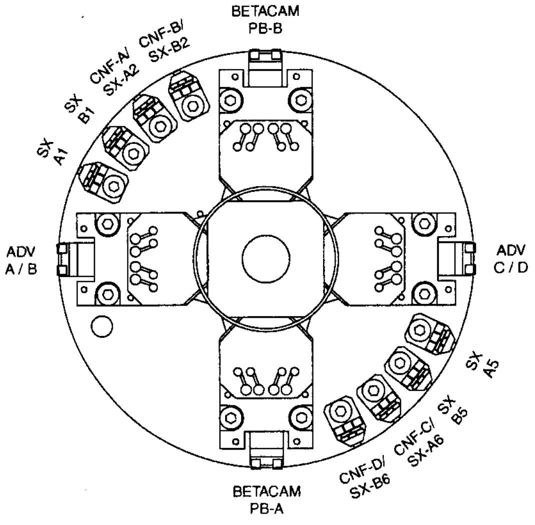
HD = HDCAM, DB = Digital Betacam, IMX = MPEG IMX, SX = Betacam SX, AB = Analog Betacam/SP

① HDW-M2000/P, S2000/P
DVW-M2000/P
MSW-A2000/P, M2000/P, M2000E/P


BETACAM
PB-B
ERA
CD
REC
C
REC
D
CNF-B/
SX-B2
CNF-A/
SX-A2
SX
B1
SX
A1
ADV
A / B
ADV
C / D
SX
A5
CNF-C/
SX-A6
SX
B5
CNF-D/
SX-B6
REC
B
REC
A
ERA
AB
BETACAM
PB-A

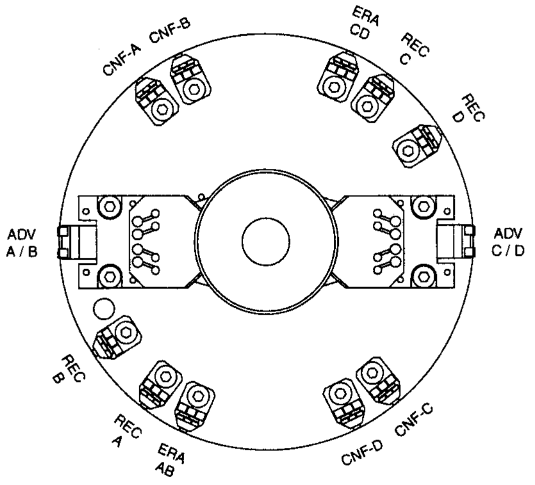
DJH-26B, 37A, 38A

② HDW-M2100/P
MSW-M2100/P, M2100E/P


BETACAM
PB-B
CNF-B/
SX-B2
CNF-A/
SX-A2
SX
B1
SX
A1
ADV
A / B
ADV
C / D
SX
A5
CNF-C/
SX-A6
SX
B5
CNF-D/
SX-B6
BETACAM
PB-A

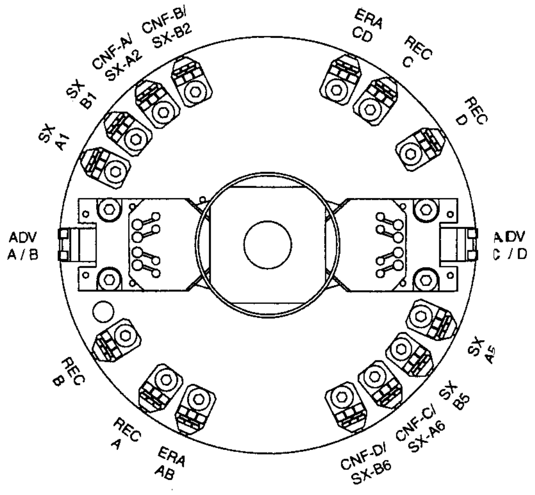
DJH-32A, 33A

③ HDW-2000, D2000 DVW-2000/P


CNF-A
CNF-B
ERA CD
REC C
REC D
ADV A / B
ADV C / D
REC B
REC A
ERA AB
CNF-D
CNF-C

DJH-28A, 39A, 40A

④ MSW-2000


SX A1
SX B1
CNF-A/ SX-A2
CNF-B/ SX-B2
ERA CD
REC C
REC D
ADV A / B
ADV C / D
SX A5
REC B
REC A
ERA AB
SX B5
CNF-C/ SX-A6
CNF-D/ SX-B6

DJH-35A

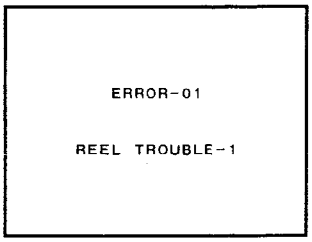
Section 2
Error Messages

2-1. Overview of Error Messages

This unit has self-diagnostics function.
When trouble is detected, an ALARM indicator is lighted immediately on the lower control panel, and an error code is displayed in the time data display area.
Also, an error code and error message are superimposed on the video monitor connected to the VIDEO OUTPUT COMPOSITE 3 (SUPER) connector or HDSDI/SDI OUTPUT 3 (SUPER) connector. Furthermore, as for the some error codes, object which error occurred is displayed as sub error message on the video monitor.

Notes

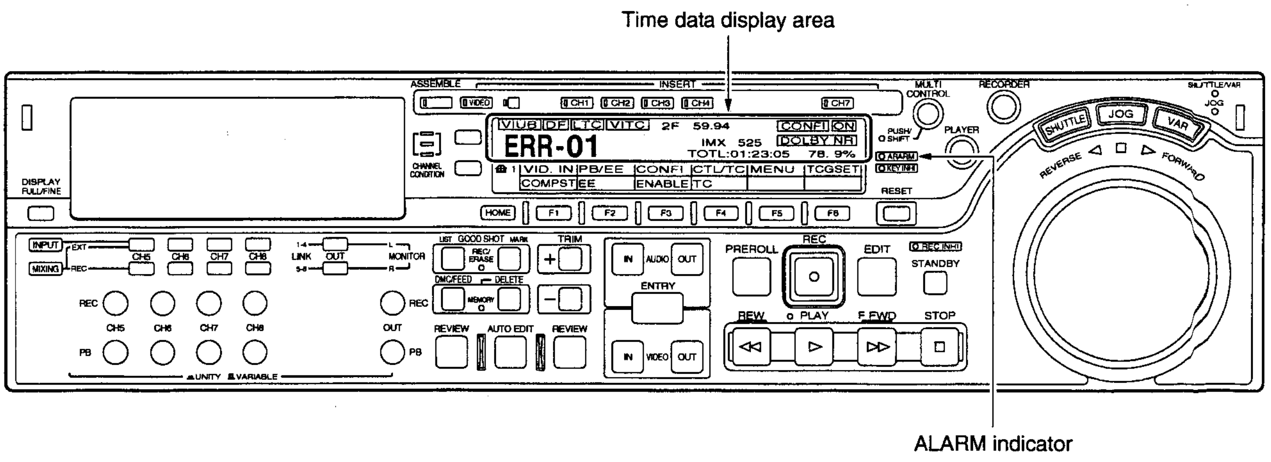
- To superimpose the error message and code on the video monitor, the F4 (CHAR) of the Function menu Page 4 must be set to ON.
- The error messages with error code are memorized to NV-RAM (Non-volatile RAM) as the error logging data.
  (Refer to Section 3-4 for the error logging data.)



ERROR-01

REEL TROUBLE-1

Ex. Superimposed on Video Monitor



HDW-M2000 (Front View)

Time Data Display Area and ALARM Indicator

Error messages are described on Section 1-26-2 in the order of list.

Error Messages

Code	Message	Page	Description
–	NO COMMUNICATION	2-4	Abnormality in the interface between the lower control panel (KY-464/569 board) and SYS CPU (SS-89 board) is detected in the lower control panel side.
01	REEL TROUBLE - 1	2-4	Tape slacking is detected in the threading or unthreading operation.
02	REEL TROUBLE - 2	2-5	Tape slacking or tape breaking is detected in the SEARCH, FF, or REW mode.
03	REEL TROUBLE - 3	2-6	Tape slacking, tape breaking, or supply or take-up reel locking is detected in the REC or PLAY mode.
04	REEL TROUBLE - 4	2-7	A malfunctional tape transport speed is detected in the FF or REW mode.
05	REEL TROUBLE - 5	2-7	The malfunctional operation of the supply or take-up reel is detected during cassette insertion.
06	TAPE TENSION ERROR	2-8	Excessive tape tension is detected in the REC or PLAY mode.
07	CAPSTAN TROUBLE	2-8	Malfunction of capstan motor is detected.
08	DRUM TROUBLE	2-9	Malfunction of drum motor is detected.
09	TH/UNTH MOTOR TIME OUT	2-9	Malfunction of threading or unthreading operation is detected.
0A	THREADING TROUBLE	2-10	It is detected that the tape top processing is not completed in the threading mode.
10	HUMID	2-10	Dew condensation is detected.
11	TAPE TOP/END SENSOR TROUBLE	2-11	The tape top and tape end are detected simultaneously.
12	TAPE TOP SENSOR TROUBLE	2-11	Malfunction of tape top sensor is detected.
13	TAPE END SENSOR TROUBLE	2-12	Malfunction of tape end sensor is detected.
14	FAN MOTOR TROUBLE	2-12	Malfunction of cooling fan motor is detected.
20	CASSETTE COMPARTMENT MOTOR LOCK	2-13	Malfunction of cassette compartment-up or down operation is detected.
21	REEL SHIFT MOTOR LOCK	2-13	Malfunction of movement of the reel table corresponding to the cassette size is detected.
22	REEL POSITION SENSOR TROUBLE	2-14	The L-cassette and S-cassette positions of the reel table are detected simultaneously.
23	THREADING RING POSITION ERROR	2-14	The thread end and unthread end states of the threading ring are detected simultaneously.
92	INTERNAL INTERFACE ERROR 1	2-15	Abnormality in the interface between SYS CPU (on SS-89 board) and CP MPU (on CP-371 board) or TELE-FILE READ/WRITE controller (on DIO-65 board) is detected.
93	CPU INITIALIZE ERROR	2-15	Abnormality in the interface between SV CPU (on SS-89 board) and DR MPU (on DR-414/508 board) is detected.
95	OTHERS NV-RAM ERROR	2-16	Abnormality operation of an NV-RAM on FP-133 board is detected.
96	SY NV-RAM ERROR	2-16	The abnormal operation of an NV-RAM (on FP-133 board) for the system control system is detected.
97	SV NV-RAM ERROR	2-17	The abnormal operation of an NV-RAM (on DR-414/508 board) for the servo system is detected.
98	RF NV-RAM ERROR	2-17	The abnormal operation of the NV-RAM for the RF system (on the EQ-84 board), NV-RAM for betacam playback system (DM-123 board) or NV-RAM for video processing system (VPR-64/91 board) is detected.
99	INTERNAL INTERFACE ERROR 2	2-18	Abnormality in the interface between SYS CPU (on SS-89 board) and SERVO CPU (on SS-89 board) or MPU (on EQ-84, DM-123, VPR-64/91, APR-52, DPR-155/229 or HIF-1 board) is detected.

Code	Message	Page	Description
E0	NETWORK INITIALIZATION ERROR	2-19	An error was detected during initialization of network interface (VN-13 board).
E1	NETWORK HARDWARE ERROR	2-19	A hardware error was detected during data communication via the network.
E2	NETWORK FILE SYSTEM ERROR	2-20	An error was detected in the file system data stored in the Tele-File label.
E3	NETWORK PROTOCOL ERROR	2-20	A software processing error was detected during data communication via the network.
E4	NETWORK MISCELLANEOUS ERROR	2-21	Communication timeout between SYS CPU (SS-89 board) and VN CPU (VN-13 board) or a hardware error was detected.
E5	NETWORK INTERFACE ERROR	2-21	FPGA (EPR-1 board) program version does not comply with network operation.

Notes

- Error codes 01 through 14 are detected in both/one of the SS-89 and/or DR-414/508 boards.
  Error codes 20 through 23 are detected in the DR-414/508 board.
  Error codes 92 through 99 are detected in the SS-89 board.
  Error codes E0 through E3 are detected in the VN-13 board.
  Error codes E4 through E5 are detected in the SS-89 board.
- There are two error groups of error codes: VTR and OTHERS. If errors occur in multiple error groups, the error message of each group are switched at two-second intervals.
  Also, if multiple errors occur in error group, the priority level of each group display are as follows:
  VTR: 97, 02, 03, 04, 05, 07, 06, 01, 09, 08, 0A, 10, 11, 12, 13, 14, 20, 21, 22, 23
  OTHERS: 92, 96, 98, 99, 93, 95, E0, E1, E2, E3, E4, E5

2-2. Details of Error Messages

Precaution

The “protection mode” described in this section means the servo control system automatically stops the tape transport and drum motor rotation, and maintains this state. The VTR cannot be automatically recovered to the normal state after the VTR once switched to the protection mode. To recover it, turn the power off, and then turn it back on with the cassette tape out.
If the protection mode is worked with the cassette tape inserted, be sure to take out the cassette tape manually with reference to “1-11. Taking Out the Cassette in Tape Slacking”. Never turn on the power again with the cassette tape in to avoid damage the tape.

(NO COMMUNICATION)

Description: Abnormality in the interface between the lower control panel's MPU (KY-464/569 board) and SYS CPU (SS-89 board) was detected.

Note

This error message is only displayed on the time data display area in that the abnormality of the interface is detected in the lower control panel side.

Detecting condition: When the lower control panel's MPU (IC U7 on KY-464 or KY-569 board) is received no interface signal from SYS CPU (IC1106 on SS-89 board) for more than two seconds.

Possible causes:

- Cable connection defect or disconnection
- Line receiver/transceiver (IC U1 on KY-464 or KY-569 board, IC1501 on SS-89 board) trouble
- SYS CPU (IC1106 on SS-89 board) trouble

Protecting operation: None

ERROR-01 REEL TROUBLE - 1

Description: Tape slacking was detected during threading or unthreading.

Detecting conditions:

1) When no take-up reel FG can be detected in the unthread operation just after activation.
2) When the relation between the take-up reel FG and threading FG is out of the specification in operations other than unthread just after activation.

Sub error message: None

Possible causes:

- Cassette compartment trouble or installation defect
  * The reel did not rotate because the cassette was lifted-up from the specified position.
- Take-up reel FG waveform shaper circuit (SS-89 board) trouble
- Take-up reel motor trouble
- Take-up reel motor drive circuit (DR-414/508 board) trouble
- Take-up reel brake trouble
- Take-up reel brake solenoid drive circuit (DR-414/508 board) trouble
- Servo adjustment defect on take-up reel
- Harness disconnection
- Take-up reel table height adjustment defect

Protecting operation: Switches to the protection mode.

CAUTION

Be sure to take out the cassette manually (refer to Section 1-11). Do not turn on the power again with the cassette tape in to avoid damage the tape.

ERROR-02 REEL TROUBLE - 2

Description: Tape slacking or tape breaking was detected in SEARCH, FF, or REW mode.

Detecting conditions:

1) When the take-up value is lower than the specified value with respect to the tape supply value.
2) When the relation among the capstan FG, supply reel FG, and take-up reel FG are out of the specification.
3) When the supply reel and take-up reel do not coincide in rotation direction continuously for more than five seconds.

Sub error message: None

Possible causes:

- Cassette compartment trouble or installation defect
  - * The reel did not rotate because the cassette was lifted-up from the specified position.
- Supply or take-up reel FG waveform shaper circuit (SS-89 board) trouble
- Supply or take-up reel motor trouble
- Supply or take-up reel motor drive circuit (DR-414/508 board) trouble
- Capstan motor trouble
- Capstan motor drive circuit (DR-414/508 board) trouble
- Capstan FG waveform shaper circuit (SS-89 board) trouble
- Take-up torque insufficiency during REW due to supply tension sensor or supply tension detector circuit (SS-89 board) trouble
- Servo adjustment defect on capstan, reel(s), and supply tension sensor
- Supply or take-up reel brake trouble
- Supply or take-up reel brake solenoid drive circuit (DR-414/508 board) trouble
- Harness disconnection
- Reel table height adjustment defect
- Tape path and drum troubles
- Tape abnormality (The winding state has a problem.)

Protecting operation: Switches to the protection mode.

If this error occurred at the tape end, the VTR may be recovered to the normal state automatically from the protection mode.

CAUTION

Be sure to take out the cassette manually (refer to Section 1-11). Do not turn on the power again with the cassette tape in to avoid damage the tape.

ERROR-03 REEL TROUBLE - 3

Description:

Tape slacking, tape breaking, or supply or take-up reel locking was detected in the REC or PLAY mode.

Detecting conditions:

1) When the take-up value is lower than the specified value with respect to the tape supply value.
2) When the relation among the capstan FG, supply reel FG, and take-up reel FG are out of the specification.
3) When the supply reel and take-up reel do not coincide in rotation direction continuously for more than five seconds.
4) When the tension value calculated from the supply tension sensor output is less than 15 g continuously for more than three seconds.

Sub error message:

None

Possible causes:

- Cassette compartment trouble or installation defect
  - * The reel did not rotate because the cassette was lifted-up from the specified position.
- Supply or take-up reel FG waveform shaper circuit (SS-89 board) trouble
- Supply or take-up reel motor trouble
- Supply or take-up reel motor drive circuit (DR-414/508 board) trouble
- Capstan motor trouble
- Capstan motor drive circuit (DR-414/508 board) trouble
- Capstan FG waveform shaper circuit (SS-89 board) trouble
- Servo adjustment defect on capstan, reel(s), and supply tension sensor
- Supply or take-up reel brake trouble
- Supply or take-up reel brake solenoid drive circuit (DR-414/508 board) trouble
- Harness disconnection
- Reel table height adjustment defect
- Tape path and drum troubles
- Tape abnormality (The winding state has a problem.)

Protecting operation:

Switches to the protection mode.

CAUTION

Be sure to take out the cassette manually (refer to Section 1-11). Do not turn on the power again with the cassette tape in to avoid damage the tape.

ERROR-04 REEL TROUBLE - 4

Description: Abnormal tape transport speed was detected in the FF or REW mode.

Detecting condition: When the tape speed calculated from the supply reel FG and take-up reel FG is under a half of the specified tape speed continuously for more than four seconds.

Sub error message: None

Possible causes:

- Cassette compartment trouble or installation defect
  - * The reel did not rotate because the cassette was lifted-up from the specified position.
- Supply or take-up reel motor trouble
- Supply or take-up reel FG waveform shaper circuit (DR-414/508 board) trouble
- Supply or take-up reel motor drive circuit (DR-414/508 board) trouble
- Servo adjustment defect on supply or take-up reel
- Supply or take-up reel brake trouble
- Supply or take-up reel brake solenoid drive circuit (DR-414/508 board) trouble
- Harness disconnection
- Reel table height adjustment defect
- Tape path and drum troubles
- Tape abnormality (The winding state has a problem.)

Protecting operation: Stops the tape transport and switches to the rest state.

ERROR-05 REEL TROUBLE - 5

Description: Abnormal supply reel or take-up reel operation was detected in a diagnosis during cassette insertion.

Detecting conditions:

1) When the supply reel FG or take-up reel FG count is less than the specified value with the reel rotated.
2) When the supply reel FG or take-up reel FG count is more than the specified value with the reel stopped.

Sub error message: None

Possible causes:

- Supply or take-up reel FG sensor trouble in reel motor
- Supply or take-up reel FG waveform shaper circuit (DR-414/508 board) trouble
- Supply or take-up reel motor drive circuit (DR-414/508 board) trouble
- Servo adjustment defect on supply or take-up reel
- Supply or take-up reel brake trouble
- Supply or take-up reel brake solenoid drive circuit (DR-414/508 board) trouble
- Harness disconnection

Protecting operation: Ejects the cassette.

ERROR-06 TAPE TENSION ERROR

Description: Excessive tension was detected in the REC or PLAY mode.

Detecting condition: When the tension value calculated from supply tension sensor output is more than 55 g continuously for more than three seconds.

Sub error message: None

Possible causes:

- Cassette compartment trouble or installation defect
  - * The reel did not rotate because the cassette was lifted-up from the specified position.
- Supply tension sensor or its related circuit (SS-89 board) trouble
- Supply reel motor trouble
- Supply reel motor drive circuit (DR-414/508 board) trouble
- Servo adjustment defect on supply reel and supply tension sensor
- Supply reel brake trouble
- Supply reel brake solenoid drive circuit (DR-414/508 board) trouble
- Harness disconnection

Protecting operation: Stops the tape transport and switches to the rest state.

ERROR-07 CAPSTAN TROUBLE

Description: Malfunction of capstan motor was detected.

Detecting conditions:

1) When the capstan FG count is less than the specified value in a diagnosis during cassette insertion.
2) When the frequency calculated from the capstan FG is out of the specification in the REC, PLAY, or SEARCH mode.

Sub error message: None

Possible causes:

- Capstan motor trouble
- FG sensor trouble in capstan motor
- Capstan motor drive circuit (DR-414/508 board) trouble
- Capstan motor FG waveform shaper circuit (SS-89 board) trouble
- Capstan FG duty adjustment defect

Protecting operations: Ejects the cassette for No. 1 in detecting conditions.
Stops the tape transport and switches to the rest state for No. 2 and No. 3 in detecting conditions.

ERROR-08 DRUM TROUBLE

Description:	Malfunction of drum motor was detected.
Detecting condition:	When the drum FG cycle is shifted more than about ±20 % continuously for more than 10 seconds as compared with during normal rotation.
Sub error message:	None
Possible causes:	• Drum motor trouble • SV CPU (IC103 on SS-89 board) trouble • DR MPU (IC100 on DR-414/508 board) trouble • Drum motor drive circuit (Q302 on DR-414/508 board) trouble • Drum FG/PG waveform shaper circuit (IC303 on DR-414/508 board) trouble • Assembly defect during upper drum replacement
Protecting operation:	Stops the tape transport and switches to the rest state in the unthread end state.

ERROR-09 TH/UNTH MOTOR TIME OUT

Description:	Malfunction of threading or unthreading operation was detected.
Detecting conditions:	1) When no operation is completed within about six seconds after operation start. 2) When states other than unthread end are continued for more than six seconds in case that the unit should be in the unthread end state.
Sub error message:	None
Possible causes:	• Unthread end sensor (TR-120 board) trouble • Thread end sensor (TR-120 board) trouble • Thread end/unthread end input port (IC103 on SS-89 board) trouble • Threading motor trouble • Threading FG sensor (PTC-102 board) trouble • Threading FG waveform shaper circuit (IC207 on DR-414/508 board) trouble • Threading motor drive circuit (IC500 on DR-414/508 board) trouble • Threading mechanism trouble
Protecting operations:	Ejects the cassette during cassette insertion or ejection. Switches to the protection mode during tape threading/unthreading. Stops the tape transport and switches to the rest state in cases except the above.

ERROR-0A THREADING TROUBLE

Description: It was detected that the tape top processing in the thread state is not completed.

Detecting condition: When the tape top is detected again after it is processed.

Tape top processing

In this processing, the tape is slightly forwarded without taking out the tape after unthread because the tape top was detected during threading.
(Short FF)

Sub error message: None

Possible causes:

- Take-up reel motor trouble
- Servo adjustment defect on take-up reel
- Take-up reel motor drive circuit (DR-414/508 board) trouble
- Tape top sensor trouble
- Tape top detection circuit (IC600 on DR-414/508 board) trouble
- Tape top input port (IC103 on SS-89 board) trouble
- Tape abnormality

Protecting operation: Switches to the rest state in the unthread end state.

ERROR-10 HUMID

Description: Dew condensation was detected.

Detecting condition: When the condensation sensor detects dew condensation continuously for about two seconds.

Sub error message: None

Possible causes:

- Actual dew detection (When the operating environment rapidly changes from low temperature to high temperature and high humidity)
- Condensation sensor trouble
- Dew input port (IC206 on DR-414/508 board) trouble

Protecting operations: Prohibits the cleaning roller operation.
Stops the tape transport and switches to the rest state in the unthread end state when the tape is threaded in states other than PLAY and REC mode.
Prohibits the tape threading.
Prohibits the cassette insertion.

ERROR-11 TAPE TOP/END SENSOR TROUBLE

Description: The tape top and tape end were detected simultaneously.

Detecting condition: When the simultaneous detection of the tape end and tape top is continued for more than seven seconds.

Sub error message: None

Possible causes:

- Tape top sensor or tape end sensor trouble
- Tape top or tape end detection circuit (IC600, IC601 on DR-414/508 board) trouble
- Tape top/tape end input port (IC103 on SS-89 board) trouble
- Harness disconnection

Protecting operation: Stops the tape transport and switches to the rest state during tape transport.

ERROR-12 TAPE TOP SENSOR TROUBLE

Description: Malfunction of tape top sensor was detected.

Detecting condition: When the tape top is detected continuously for more than seven seconds.

Sub error message: None

Possible causes:

- Tape top sensor trouble
- Tape top detection circuit (IC600 on DR-414/508 board) trouble
- Tape top input port (IC103 on SS-89 board) trouble
- Harness disconnection
- The tape cannot move at the tape top due to troubles other than the tape sensor.

Protecting operations: In the FF mode, continues the operation until the tape end is detected. Stops the tape transport and switches to the rest state when the tape end is detected.
During tape transport in forward direction, the FF mode can be entered only while the total tape quantity is observed.
Stops the tape transport and switches to the rest state during tape transport except the above.

ERROR-13 TAPE END SENSOR TROUBLE

Description:	Malfunction of tape end sensor was detected.
Detecting condition:	When the tape end is detected continuously for more than seven seconds.
Sub error message:	None
Possible causes:	• Tape end sensor trouble • Tape end detection circuit (IC601 on DR-414/508 board) trouble • Tape end input port (IC103 on SS-89 board) trouble • Harness disconnection • The tape cannot move at the tape end due to troubles other than the tape sensor.
Protecting operations:	In the REW mode, continues the operation until the tape top is detected. Stops the tape transport and enters the rest state when the tape top is detected. During the tape transport in reverse direction, the REW mode can be entered only while the total tape quantity is observed. Stops the tape transport and switches to the rest state during tape transport except the above.

ERROR-14 FAN MOTOR TROUBLE

Description: Malfunction of cooling fan motor was detected.

CAUTION

If this error occurred, stop operation of the unit immediately, and turn off the power.
If the unit is used continuously without fan operation, overhearting inside the unit can cause a fire or failure.

Detecting condition:	When the fan motor FG frequency is less than the specified value continuously for more than one second.
Sub error message:	None
Possible causes:	• Fan motor trouble • Fan motor FG input circuit (IC909, 912 on SS-89 board) trouble
Protecting operation:	None

Note

This unit has five fan motors.
All fan motors always operate when power of the VTR is turned on.
When the above detecting condition is satisfied by any fan motor, this error occurs.

ERROR-20 CASSETTE COMPARTMENT MOTOR LOCK

Description: Malfunction of cassette compartment-up or down operation was detected.

Detecting condition: When no operation is completed within about six seconds after operation start.

Sub error message: None

Possible causes:

- Cassette compartment block trouble
- Cassette compartment motor drive circuit (DR-414/508 board) trouble
- Cassette-down sensor (CL-29 board) trouble
- Cassette-down input port (IC100 on DR-414/508 board) trouble

Protecting operation: Stops the movement of the cassette compartment and reel table until a cassette eject button is pushed.

ERROR-21 REEL SHIFT MOTOR LOCK

Description: Malfunction of movement of the reel table corresponding to the cassette size was detected.

Detecting condition: When no operation is completed within about 18 seconds after operation start.

Sub error message: None

Possible causes:

- Reel shift mechanism trouble
- Reel shift motor trouble
- Reel shift motor drive circuit (IC501 on DR-414/508 board) trouble
- Reel position sensor (PH203, PH204 on DR-414/508 board) trouble (S position sensor or L position sensor)
- Reel position input port (IC100 on DR-414/508 board) trouble

Protecting operation: Stops the movement of the reel table and ejects the cassette during cassette loading.

ERROR-22 REEL POSITION SENSOR TROUBLE

Description: The L and S cassette positions of the reel table were detected simultaneously.

Detecting condition: When the L and S position sensors detect the L and S cassette positions, respectively at the same time.

Sub error message: None

Possible causes:

- S position sensor (PH203 on DR-414/508 board) trouble
- L position sensor (PH204 on DR-414/508 board)) trouble
- Reel position input port (IC100 on DR-414/508 board) trouble

Protecting operation: When an error occurs during cassette insertion, ejects the cassette, if possible.
Prohibits the cassette insertion.

ERROR-23 THREADING RING POSITION ERROR

Description: The thread end and unthread end states were detected simultaneously.

Detecting condition: When the thread end and unthread end sensors detect the thread end and unthread end states, respectively at the same time.

Sub error message: None

Possible causes:

- Thread end sensor (TR-120 board) trouble
- Unthread end sensor (TR-120 board) trouble
- Thread end or unthread end input port (IC103 on SS-89 board) trouble

Protecting operations: Ejects the cassette during cassette insertion or ejection.
Switches to the protection mode during tape threading/unthreading.
Stops the tape transport and switches to the rest state in cases except the above.

ERROR-92 INTERNAL INTERFACE ERROR 1

Description: Abnormality was detected in the communication between SYS CPU (IC1106 on SS-89 board) and CP MPU (IC706 on CP-371 board) or TELE-FILE READ/WRITE controller (IC102 on DIO-65 board).

Sub error messages and Detecting conditions:

CP: When the communication with CP-371 board's MPU (IC706) is in abnormal state.

TELE-FILE: When the communication with READ/WRITE controller (IC102 on DIO-65 board) is in abnormal state.

Possible causes:

CP:
- Cable (between MB-884 board and CP-371 board) connection defect
- MPU control interface circuit (IC1703, 1706 on SS-89 board) trouble
- CP-371 board's MPU (IC706) trouble
- Interface buffer (IC712, 713 on CP-371 board) trouble

TELE-FILE:
- Cable (between FP-133 board and DIO-65 board) connection defect
- MPU control interface circuit (IC1703, 1706 on SS-89 board) trouble
- READ/WRITE controller (IC102 on DIO-65 board) trouble

Protecting operations: None

ERROR-93 CPU INITIALIZE ERROR

Description: Abnormality was detected in the communication between SV CPU (SS-89 board) and DR MPU (DR-414/508 board).

Sub error message and Detecting condition:

DR: When the communication with DR MPU (IC100 on DR-414/508 board) at power-on is in abnormal state.

Possible cause: **DR**: IC100 and its peripheral circuit on DR-414/508 board trouble

Protecting operation: Prohibits the cassette insertion.

ERROR-95 OTHERS NV-RAM ERROR

Description: The abnormal operation of an NV-RAM on FP-133 board was detected.

Sub error message and Detecting condition:

REMOTE-2 DATA RESET: When the REMOTE-2 (50-pin) setting data in an NV-RAM (IC114, 115 on FP-133 board) is abnormal and the setting data is reset.

Possible cause: IC114 and IC115 on FP-133 board trouble

Protecting operation: Resets the 50-pin parallel remote (REMOTE-2) setting data to the factory setting.

ERROR-96 SY NV-RAM ERROR

Description: The abnormal operation of an NV-RAM (FP-133 board) for the system control system was detected.

Sub error messages and Detecting conditions:

CURRENT SETUP:	When the data error occurs in the setup menu current memory area during the data write or read .
SETUP BANK1:	When the data error occurs in the setup menu bank 1 memory area during the data write or read.
SETUP BANK2:	When the data error occurs in the setup menu bank 2 memory area during the data write or read.
SETUP BANK3:	When the data error occurs in the setup menu bank 3 memory area during the data write or read.
SETUP BANK4:	When the data error occurs in the setup menu bank 4 memory area during the data write or read.
ID CODE:	When the data error occurs in the ID code memory area during the data write or read.
CALENDAR CLOCK:	When the calendar/clock function was stopped.

Possible causes:

- NV-RAM (IC111 on FP-133 board) trouble
- Address data base (IC2102 through IC2107 on SS-89 board) trouble
- Backup battery for NV-RAM is out of life

Protecting operations: When the error occurs in setting data of the setup menu, resets those data to the factory settings.
When the error occurs in ID data, resets the data to 00 : 00 : 00 : 00.
When the error occurs at the calendar/clock function, resets the date and time data to 2000 08 16 00 00 00 (= Year, Month, Day, Hour, Minute, Second).

ERROR-97 SV NV-RAM ERROR

Description:	The abnormal operation of an NV-RAM (DR-414/508 board) for the servo system was detected.
Detecting condition:	When the checksum of NV-RAM data does not coincide during activation.
Sub error message:	None
Possible cause:	NV-RAM (IC101 on DR-414/508 board) trouble
Protecting operation:	Switches to the protection mode.

ERROR-98 RF NV-RAM ERROR

Description: The abnormal operation of an NV-RAM (EQ-84 board) for RF system, betacam playback system of an NV-RAM (on DM-123 board), or video process system of an NV-RAM (on VPR-64 board for HDW series and MSW series or on VPR-91 board for DVW series) was detected.

Sub error message and Detecting condition:

EQ: When the error occurs in the NV-RAM for RF system (IC1110 on EQ-84 board) during the data write or read.

DM: When the error occurs in betacam playback system of the NV-RAM (IC1805 on DM-123 board) during the data write or read.

VPR: When the error occurs in video process system of the NV-RAM (IC1512 on VPR-64/91 board) during the data write or read.

Possible cause:

EQ: Trouble of the NV-RAM (IC1110 on EQ-84 board) for RF system

DM: Betacam playback system of the NV-RAM (IC1805 on DM-123 board) trouble

VPR: Video process system of the NV-RAM (IC1512 on VPR-64/91 board) trouble

Protecting operation: None

Note

The DM-123 board is not mounted in HDW-2000/D2000, DVW-2000 and MSW-2000.

ERROR-99 INTERNAL INTERFACE ERROR 2

Description: Abnormality was detected in the communication between SYS CPU (IC1106 on SS-89 board) and SERVO CPU (SS-89 board) or MPU (on EQ-84, DM-123, VPR-64/91, APR-52, DPR-155/229, or HIF-1 board).

Sub error messages and Detecting conditions:

SV: When the SERVO CPU (IC103 on SS-89 board) initialization at power-on is in abnormal state.

EQ: When the communication with MPU (IC1113 on EQ-84 board) is in abnormal state.

DM: When the communication with MPU (IC908 on DM-123 board) is in abnormal state.

VPR: When the communication with MPU (on VPR-64/91 board) is in abnormal state.

APR: When the communication with MPU (on APR-52 board) is in abnormal state.

DPR: When the communication with MPU (on DPR-155/229 board) is in abnormal state.

HIF: When the communication with MPU (on HIF-1 board) is in abnormal state.

Possible causes:

SV:
- Servo system (IC100 series or IC300 series on SS-89 board) trouble
- Bus buffers (IC1306 to 1309 on SS-89 board) trouble
- Servo CPU (IC103 on SS-89 board) trouble

EQ:
- Interface buffer (IC2100 on SS-89 board) trouble
- Interface buffers (IC1104, 1112 on EQ-84 board) trouble
- MPU (IC1113 on EQ-84 board) trouble

DM:
- Interface buffer (IC2100 on SS-89 board) trouble
- Interface buffers (IC904, 906 on DM-123 board) trouble
- MPU (IC908 on DM-123 board) trouble

VPR:
- Interface buffers (IC1532 to 1537 on VPR-64/91 board) trouble
- IC1509 on VPR-64/91 board trouble

APR:
- Interface buffers (IC1500 to 1503, 1505 and 1509 on APR-52 board) trouble
- IC1425 on APR-52 board trouble

DPR:
- Interface buffers (IC107 to 110 and IC112 to 119 on DPR-155/229 board) trouble

HIF:
- Interface buffers (IC900 to 903, 907 and 909 on HIF-1 board) trouble
- IC717 on HIF-1 board trouble

Protecting operations: When the sub error message is "**SV**", enters the protection mode.
When it is except above, displays only this error.

Note

The DM-123 board is not mounted in HDW-2000/D2000, DVW-2000 and MSW-2000.

ERROR-E0 NETWORK INITIALIZATION ERROR

Description: An error was detected during initialization of network interface (VN-13 board).

Sub error messages and Detecting conditions:

FLASH: When flash memory (VN-13 board) data read error was detected.

DPRAM: When VN CPU detected an error during initialization of dual-port RAM used for communication between SYS CPU (IC1106 on SS-89 board) and VN CPU (IC1 on VN-13 board).

NETWORK: An error was detected during hardware initialization of network interface (VN-13 board).

Possible causes:

FLASH: Flash memory (IC104/IC105 on VN-13 board) failure

DPRAM:
- IC601 (VN-13 board) failure
- PCI bus bridge (IC2 on VN-13 board) failure

NETWORK:
- IC601 (VN-13 board) failure
- PCI bus bridge (IC2 on VN-13 board) failure

Protecting operations: None

ERROR-E1 NETWORK HARDWARE ERROR

Description: A hardware error was detected during data communication via the network.

Sub error messages and Detecting conditions:

TX: When a hardware error was detected during data transmission via the network.

RX: When a hardware error was detected during data reception via the network.

Possible causes:

TX:
- IC601 (VN-13 board) failure
- PCI bus bridge (IC2 on VN-13 board) failure
- PHY (IC701 on VN-13 board) failure

RX:
- IC601 (VN-13 board) failure
- PCI bus bridge (IC2 on VN-13 board) failure
- PHY (IC701 on VN-13 board) failure

Protecting operations: Resets the VN CPU (IC1 on VN-13 board) to reinitialize the hardware on the VN-13 board.

ERROR-E2 NETWORK FILE SYSTEM ERROR

Description: An error was detected in the file system data stored in the Tele-File label.

Sub error messages and Detecting conditions:

TELE-FILE: When an access error occurred during TELE-FILE data read/write.

FILE SYSTEM: When a sum check error occurred in the file system data that was read from TELE-FILE.

Possible causes:

TELE-FILE:
- Failure of IC102 or IC103 (DIO-65 board) incorporating TELE-FILE access module
- Improper connection of harness connected to CN1 (DIO-65 board) or failure of CN1

FILE SYSTEM:
- Defective TELE-FILE label on the cassette

Protecting operations: None

ERROR-E3 NETWORK PROTOCOL ERROR

Description: An error regarding application protocol software processing was detected during data communication via the network.

Sub error messages and Detecting conditions:

FTP: When a software processing error was detected in the FTP protocol processor.

DTP: When a software processing error was detected during data communication via the network.

Possible causes:

FTP: Failure of ICs (IC1 to IC10) around VN CPU (IC1 on VN-13 board)

DTP: Failure of ICs (IC1 to IC10 or IC601) around VN CPU (IC1 on VN-13 board)

Protecting operations: Resets the VN CPU (IC1 on VN-13 board) to reinitialize the hardware on the VN-13 board.

ERROR-E4 NETWORK MISCELLANEOUS ERROR

Description: Communication timeout between SYS CPU (IC1106 on SS-89 board) and VN CPU (IC1 on VN-13 board) or a hardware error was detected.

Sub error messages and Detecting conditions:

VN TIME OUT:	When initialization end code (to be transmitted from VN CPU to SYS CPU) was not detected after specified time period (10 seconds) passed.
VN HARD ERROR:	When FPGA (IC412 on VN-13 board) program version was not read correctly.

Possible causes:

VN TIME OUT:	• Buffer (IC102 on VN-13 board) failure • IC601 (VN-13 board) failure
VN HARD ERROR:	• PLD (IC103 on VN-13 board) or FPGA (IC412 on VN-13 board) failure

Protecting operations: None

ERROR-E5 NETWORK INTERFACE ERROR

Description: FPGA (EPR-1 board) program version does not comply with network operation.

Detecting condition: When FPGA (EPR-1 board) program version other than 3.05 or 4.00 was detected.

Sub error message: EPR VERSION

Possible causes:

- FPGA program version does not comply with network operation.
- FPGA (IC900 on EPR-1 board) or ROM (IC901 on EPR-1 board) failure

Protecting operations: None

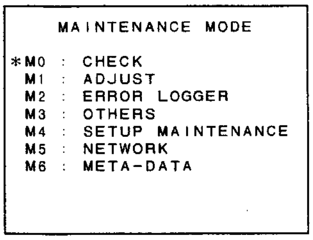
Section 3
Maintenance Mode

3-1. Overview of Maintenance Mode

This unit has the maintenance mode that is useful during maintenance and trouble diagnosis.
This maintenance mode consists of the six modes below. The contents of the maintenance mode are superimposed on the video monitor connected to the VIDEO OUTPUT COMPOSITE 3 (SUPER), SDI OUTPUT 3 (SUPER), or HD SDI OUTPUT 3 (SUPER) (for HDW series) connector.

Notes

- To superimpose the contents of the maintenance mode, set F4 (CHAR) of the function menu Page 4 to ON.
- Some of the following sub modes on the respective screens may not be displayed according to the model used. For details, refer to the outline of each mode (sections M0 : 3-2-1, M1 : 3-3-1, M2 : 3-4-1, M3 : 3-5-1, M4 : 3-6-1, M5 : 3-7-1, M6 : 3-8-1)



```
      MAINTENANCE MODE

*M0 : CHECK
 M1 : ADJUST
 M2 : ERROR LOGGER
 M3 : OTHERS
 M4 : SETUP MAINTENANCE
 M5 : NETWORK
 M6 : META-DATA
```

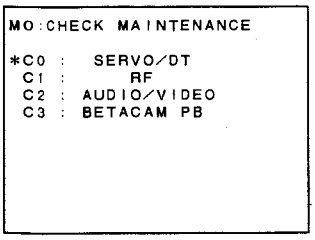
Note

The typeface of characters displayed on the video monitor differs from the actual one.

(Mode screen during activation of maintenance mode)

M0 : CHECK MAINTENANCE .... (Section 3-2)

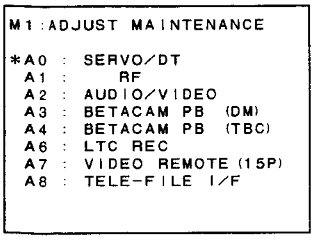
This mode is used to check this unit.



```
M0:CHECK MAINTENANCE

*C0 :  SERVO/DT
 C1 :     RF
 C2 : AUDIO/VIDEO
 C3 : BETACAM PB
```

M1 : ADJUST MAINTENANCE .... (Section 3-3)

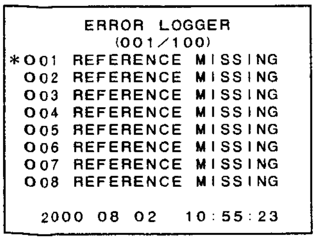
This mode is used to adjust this unit.



```
M1:ADJUST MAINTENANCE

*A0 : SERVO/DT
 A1 :    RF
 A2 : AUDIO/VIDEO
 A3 : BETACAM PB  (DM)
 A4 : BETACAM PB  (TBC)
 A6 : LTC REC
 A7 : VIDEO REMOTE (15P)
 A8 : TELE-FILE I/F
```

M2 : ERROR LOGGER .... (Section 3-4)

This mode is used to display the record of errors (error logging) that occur in this unit.



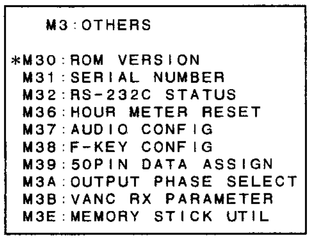
```
        ERROR LOGGER
          (001/100)
*001 REFERENCE MISSING
 002 REFERENCE MISSING
 003 REFERENCE MISSING
 004 REFERENCE MISSING
 005 REFERENCE MISSING
 006 REFERENCE MISSING
 007 REFERENCE MISSING
 008 REFERENCE MISSING

  2000 08 02    10:55:23
```

Note

The display on the left is one of the displayed examples.

M3 : OTHERS .... (Section 3-5)

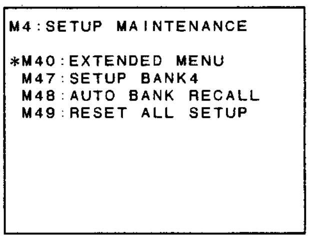
This mode is used for checking and setting the others.



```
   M3:OTHERS

*M30:ROM VERSION
 M31:SERIAL NUMBER
 M32:RS-232C STATUS
 M36:HOUR METER RESET
 M37:AUDIO CONFIG
 M38:F-KEY CONFIG
 M39:50PIN DATA ASSIGN
 M3A:OUTPUT PHASE SELECT
 M3B:VANC RX PARAMETER
 M3E:MEMORY STICK UTIL
```

M4 : SETUP MAINTENANCE .... (Section 3-6)

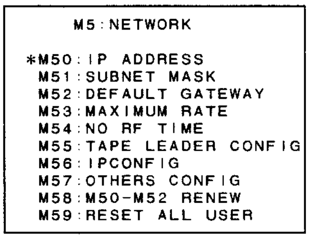
This mode is used to set the setup menu.



```
M4:SETUP MAINTENANCE

*M40:EXTENDED MENU
 M47:SETUP BANK4
 M48:AUTO BANK RECALL
 M49:RESET ALL SETUP
```

M5 : NETWORK .... (Section 3-7)

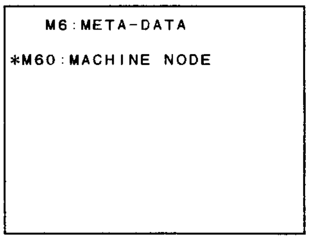
This mode is used for basic settings on network. (Displays only for e-VTR.)



```
     M5:NETWORK

 *M50:IP ADDRESS
  M51:SUBNET MASK
  M52:DEFAULT GATEWAY
  M53:MAXIMUM RATE
  M54:NO RF TIME
  M55:TAPE LEADER CONFIG
  M56:IPCONFIG
  M57:OTHERS CONFIG
  M58:M50-M52 RENEW
  M59:RESET ALL USER
```

M6 : META-DATA .... (Section 3-8)

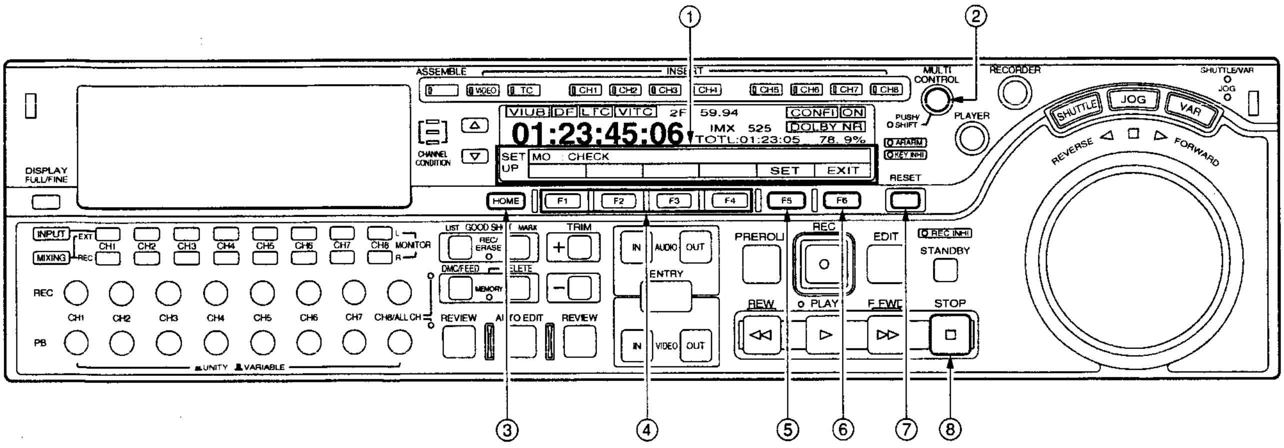
This mode is used to verify MACHINE NODE data recorded as UMID.



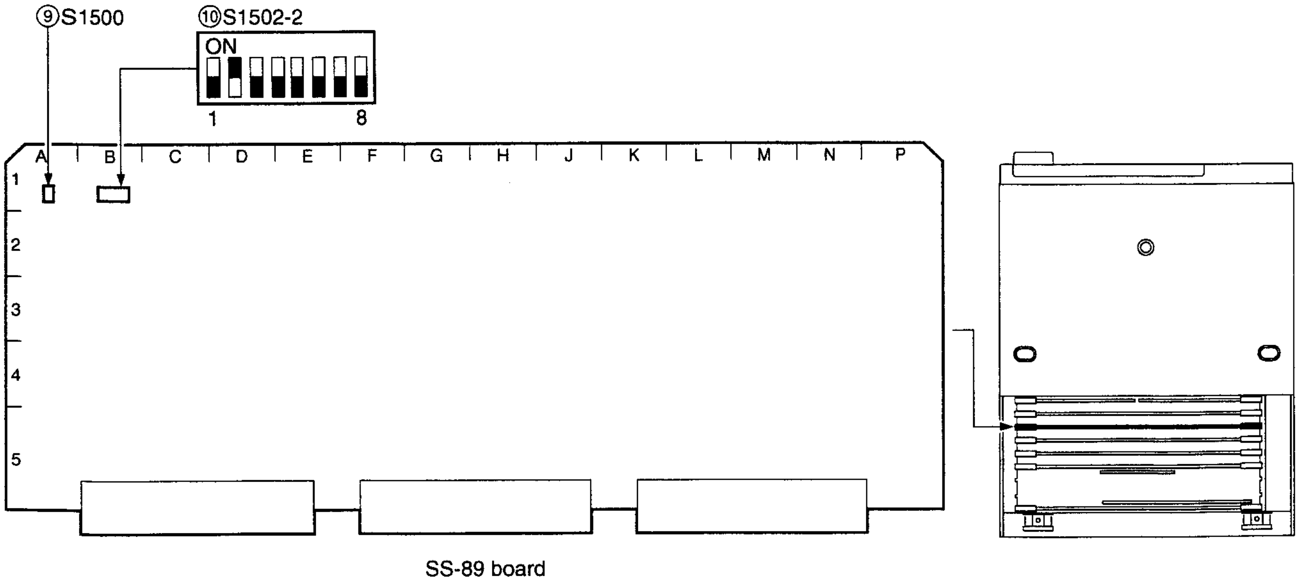
```
   M6:META-DATA

*M60:MACHINE NODE
```

Buttons and Switches for Operation

The main buttons and switches related to the operation of maintenance mode are as follows. The ordinary functions of these buttons and switches and how to use them are described below.


①
②
③
④
⑤
⑥
⑦
⑧
ASSEMBLE
INSERT
MULTI CONTROL
RECORDER
PLAYER
SHUTTLE/VAR
JOG
SHUTTLE
VAR
REVERSE
FORWARD
01:23:45:06
MO CHECK
SET
EXIT
DISPLAY FULL/FINE
CHANNEL CONDITION
HOME
F1
F2
F3
F4
F5
F6
RESET
PREROLL
REC
EDIT
STANDBY
ENTRY
REW
PLAY
F FWD
STOP
INPUT
MIXING
REC
PB
CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
MONITOR
TRIM
REVIEW
AUTO EDIT
AUDIO
VIDEO
IN
OUT

Lower Control Panel


⑨S1500
⑩S1502-2
ON
1
8
A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
3
4
5
SS-89 board

Location of Switches on SS-89 Board

① Menu display area
The ① menu display area displays the menu (mode) No., menu title, selection item and status or data. The menu (mode) No. or selection item block blinks while the menu (mode) or selection item is specified (not including the servo menu in the TAPE maintenance mode). For manual adjustment menu, the data block blinks while the ③ HOME button is pressed.
There are menus (modes) that contain insufficient information displayed in the menu display area. Since the information displayed on the video monitor is easier to operate and check, usually use a video monitor.
The lower line of the ① menu display area indicates functions of F1 to F6 buttons.

② MULTI CONTROL knob

Turn the ② MULTI CONTROL knob to specify the menu (mode) or selection item. An "*" mark moves on the video monitor. In the menu display area, the specified item only is displayed and blinks.

The data value or setting is changed when the ② MULTI CONTROL knob is turned with pressing the ③ HOME button in the manual adjust menu or the setting select menu.

③ HOME button

The maintenance mode is activated by pressing the ⑤ F5 (MENU) button with pressing the ③ HOME button when the system is set so that the maintenance mode can be activated by the button operation on the control panel. Refer to ⑩.

The data value or setting is changed when the ② MULTI CONTROL knob is turned with pressing the ③ HOME button in the manual adjust menu or the setting select menu.

④ F1 to F4 buttons

The functions of these buttons are displayed in the lower line of the menu display area. When no function is assigned to the button, nothing is displayed.

⑤ F5 (MENU SET) button

Press the ⑤ F5 (SET) button in the maintenance mode to execute the menu (mode) selected using the ② MULTI CONTROL knob or to proceed to the select menu of the next level.

The maintenance mode is activated when the ⑤ F5 (MENU) button is pressed while pressing the ③ HOME button when the system is set so that the maintenance mode can be activated by the button operation on the control panel. Refer to ⑩.

⑥ F6 (EXIT) button

Press the ⑥ F6 (EXIT) button in the maintenance mode to return to the screen (state) preceding by one step.

The maintenance mode is terminated if this button is pressed when the mode screen is displayed (mode No. M0, M1, M2, M3, M4 or M5 blinks in the menu display area).

⑦ RESET button

Press this button in the error logger mode to erase the recorded error log.

⑧ STOP button

The data value of an electronic volume control is displayed only while the ⑧ STOP button is pressed in RF system automatic adjustment menu (A1 : RF).

⑨ S1500/SS-89 board : Maintenance mode start switch (MAINTE)

Press this switch to activate the maintenance mode.

⑩ S1502-2/SS-89 board : Maintenance mode access approval switch (MAINTE MODE Access)

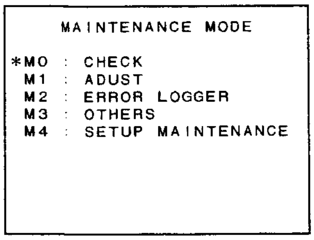
Set this switch to ON (upper) in advance when activating the maintenance mode by the button operation on the control panel.

Notes

- The factory setting for HDW series is ON (upper side).
  The factory setting for DVW series and MSW series is OFF (lower side).
- Remove the upper lid (rear) referring to Section 1-3-1 when operating the switches on the SS-89 board. Change the setting of DIP switch S1502 with the power switch set to OFF.

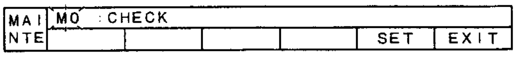
Activating the Maintenance Mode

1. Check that the video monitor is connected to the VIDEO OUTPUT COMPOSITE 3 (SUPER) or SDI OUTPUT 3 (SUPER) connector.
2. Press the ⑨ S1500 switch on the SS-89 board.
3. The mode screen in the maintenance mode is superimposed on the video monitor.
   In the ① menu display area, "M0 : CHECK" is displayed and M0 blinks.



```
MAINTENANCE MODE

*M0 : CHECK
 M1 : ADUST
 M2 : ERROR LOGGER
 M3 : OTHERS
 M4 : SETUP MAINTENANCE
```

Video Monitor



MAI NTE	M0 : CHECK					
					SET	EXIT

Menu Display Area

Activating the Maintenance Mode from Control Panel

The maintenance mode can be activated by the operation below when the ⑩ S1502-2 switch on the SS-89 board is set to ON (upper).

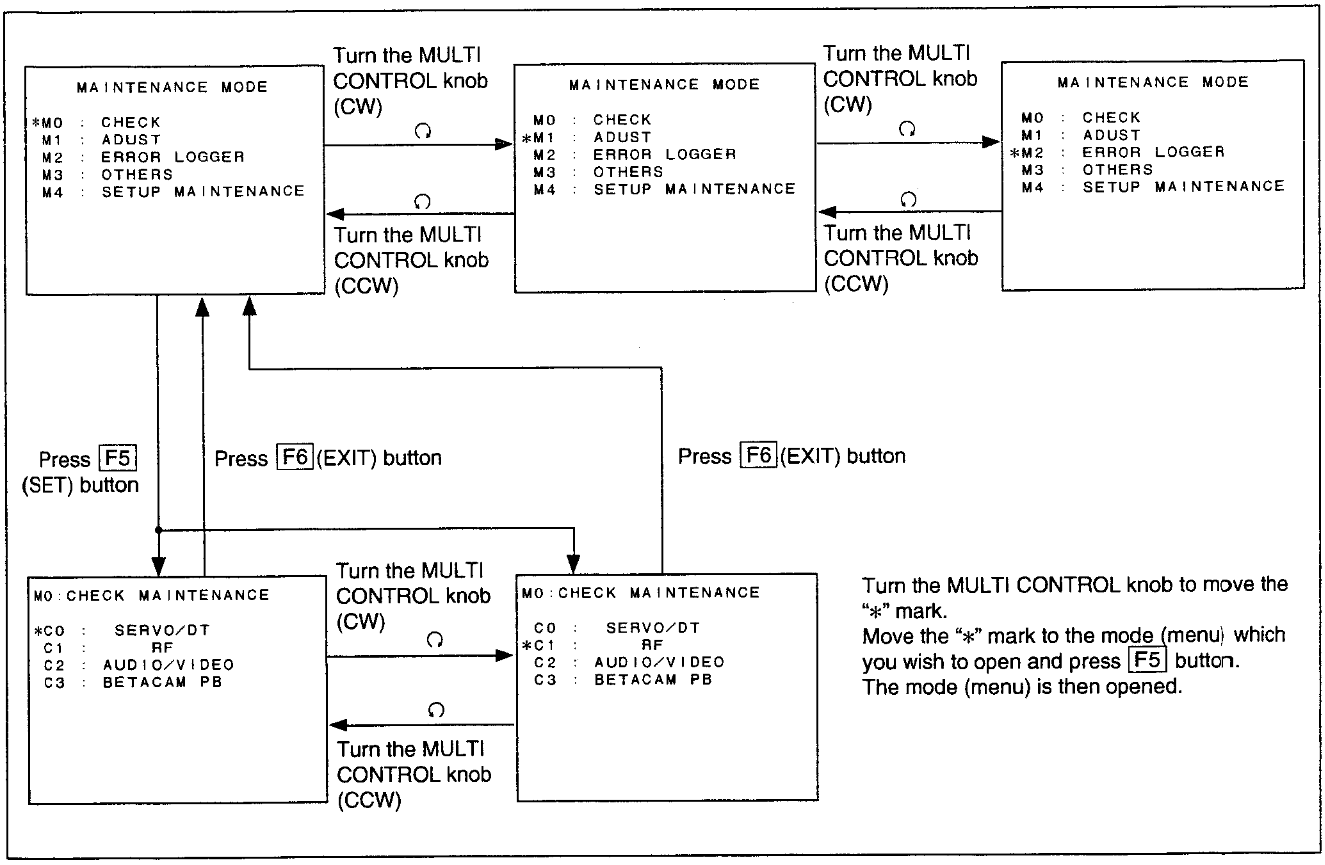
1. Press the ③ HOME button to go to the home page.
2. Press the ⑤ F5 (SET) button while pressing the ③ HOME button.
3. The mode screen in the maintenance mode is displayed on the video monitor.
   "M0 : CHECK" is displayed and "M0" blinks in the ① menu display area.

Terminating the Maintenance Mode

Press the ⑥ F6 (EXIT) button several times to terminate the maintenance mode. While the maintenance mode is terminated, the time code or CTL count is displayed on the video monitor and the HOME page of the function menu is displayed on the menu display area.

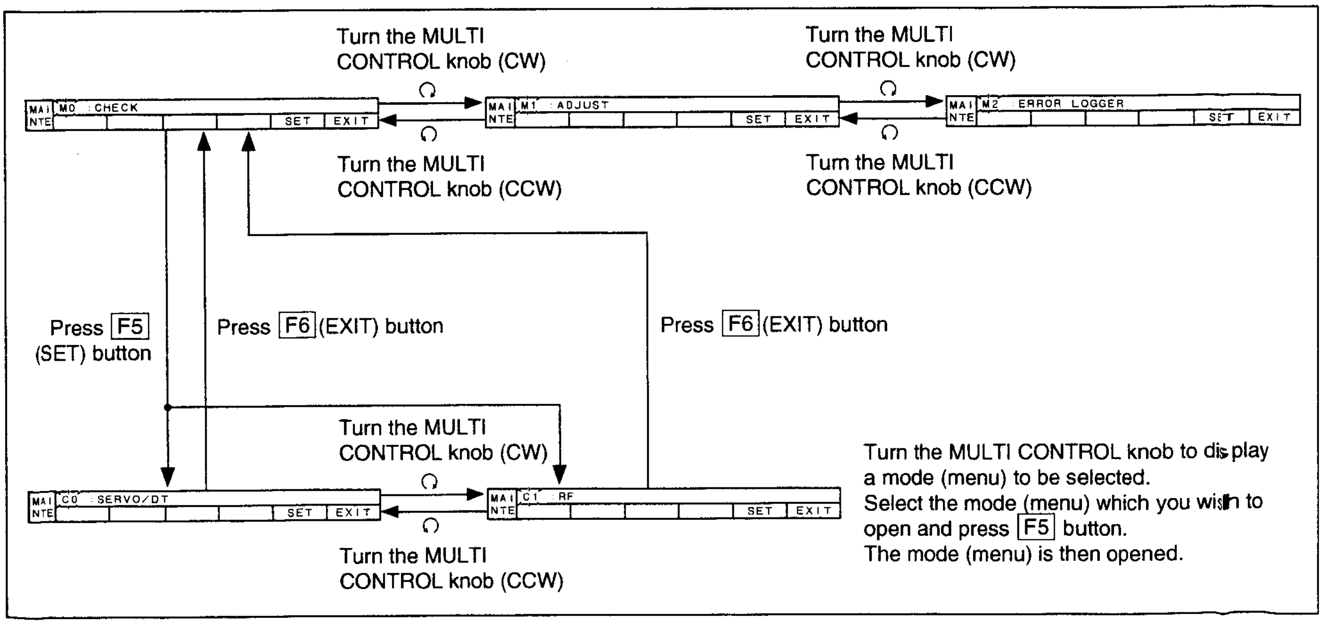
Specifying the Menu (Mode) and Item

How to specify the menu (mode) and item using the ② MULTI CONTROL knob is described below with the mode selection given as an example.


MAINTENANCE MODE
*M0 : CHECK
M1 : ADUST
M2 : ERROR LOGGER
M3 : OTHERS
M4 : SETUP MAINTENANCE
Turn the MULTI CONTROL knob (CW)
Turn the MULTI CONTROL knob (CCW)
MAINTENANCE MODE
M0 : CHECK
*M1 : ADUST
M2 : ERROR LOGGER
M3 : OTHERS
M4 : SETUP MAINTENANCE
Turn the MULTI CONTROL knob (CW)
Turn the MULTI CONTROL knob (CCW)
MAINTENANCE MODE
M0 : CHECK
M1 : ADUST
*M2 : ERROR LOGGER
M3 : OTHERS
M4 : SETUP MAINTENANCE
Press F5 (SET) button
Press F6 (EXIT) button
Press F6 (EXIT) button
M0 : CHECK MAINTENANCE
*C0 : SERVO/DT
C1 : RF
C2 : AUDIO/VIDEO
C3 : BETACAM PB
Turn the MULTI CONTROL knob (CW)
Turn the MULTI CONTROL knob (CCW)
M0 : CHECK MAINTENANCE
C0 : SERVO/DT
*C1 : RF
C2 : AUDIO/VIDEO
C3 : BETACAM PB

Turn the MULTI CONTROL knob to move the "*" mark.
Move the "*" mark to the mode (menu) which you wish to open and press F5 button.
The mode (menu) is then opened.

Example in Superimpose Picture on Video Monitor


Turn the MULTI CONTROL knob (CW)
Turn the MULTI CONTROL knob (CW)
MAINTE M0 : CHECK SET EXIT
MAINTE M1 : ADJUST SET EXIT
MAINTE M2 : ERROR LOGGER SET EXIT
Turn the MULTI CONTROL knob (CCW)
Turn the MULTI CONTROL knob (CCW)
Press F5 (SET) button
Press F6 (EXIT) button
Press F6 (EXIT) button
Turn the MULTI CONTROL knob (CW)
MAINTE C0 : SERVO/DT SET EXIT
MAINTE C1 : RF SET EXIT
Turn the MULTI CONTROL knob (CCW)

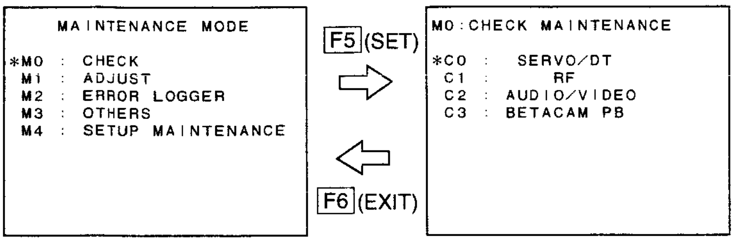
Turn the MULTI CONTROL knob to display a mode (menu) to be selected.
Select the mode (menu) which you wish to open and press F5 button.
The mode (menu) is then opened.

Example in Menu Display Area

3-2. CHECK MAINTENANCE Mode (M0)

3-2-1. Overviews

The M0 : CHECK MAINTENANCE consists of the four modes below.



```
      MAINTENANCE MODE

*M0  :  CHECK
 M1  :  ADJUST
 M2  :  ERROR LOGGER
 M3  :  OTHERS
 M4  :  SETUP MAINTENANCE
```

```
M0:CHECK MAINTENANCE

*C0  :   SERVO/DT
 C1  :      RF
 C2  :  AUDIO/VIDEO
 C3  :  BETACAM PB
```

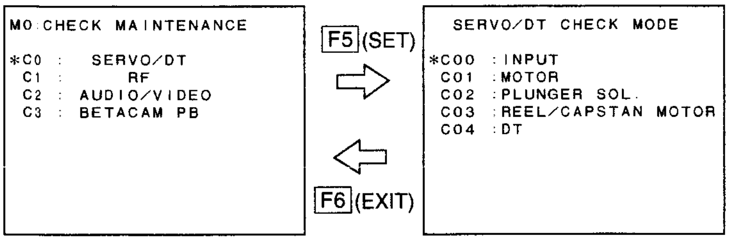
MAINTENANCE Mode **CHECK MAINTENANCE Mode**

Note

C3 : BETACAM PB mode will not be displayed in HDW-2000/D2000, DVW-2000/P and MSW-2000.

C0 : SERVO/DT

This mode is used to check the servo and DT systems. Refer to Section 3-2-2 in detail.



```
M0 CHECK MAINTENANCE

*C0 :   SERVO/DT
 C1 :      RF
 C2 :  AUDIO/VIDEO
 C3 :  BETACAM PB
```

```
   SERVO/DT CHECK MODE

*C00  : INPUT
 C01  : MOTOR
 C02  : PLUNGER SOL.
 C03  : REEL/CAPSTAN MOTOR
 C04  : DT
```

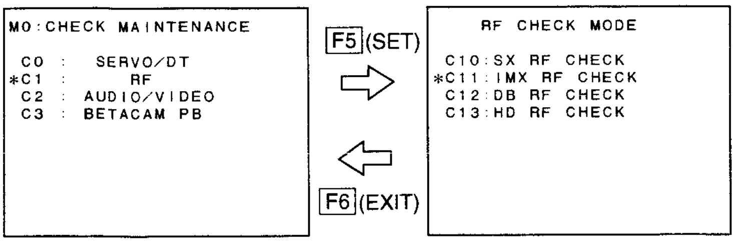
Title	Page	Description
C00 : INPUT	—	Check mode of sensors
C000 : CASSETTE SW	3-12	Checks the cassette tab sensor.
C001 : CASSETTE COMP. SW	3-13	Checks the cassette-in and cassette size sensors.
C002 : TOP/END SENSOR	3-14	Checks the tape top (beginning) and tape end sensors.
C003 : DEW SENSOR	3-15	Checks the dew (condensation) sensors.
C01 : MOTOR	—	Check mode of motors (except a fan motor) and partial sensors
C010 : S REEL	3-16	Checks the S reel motor.
C011 : T REEL	3-16	Checks the T reel motor.
C012 : THREADING	3-17	Checks the threading motor and threading/unthreading end sensors.
C013 : CASSETTE COMP.	3-18	Checks the cassette compartment motor and cassette-down sensors.
C014 : CAPSTAN	3-19	Automatically checks the capstan motor.
C015 : DRUM	3-20	Automatically checks the drum motor.
C016 : REEL POSITION	3-21	Checks the reel shift motor and reel position sensors.
C02 : PLUNGER SOL.	—	Check mode of solenoids
C020 : PINCH ROLLER	3-22	Checks the pinch roller solenoid.
C021 : S REEL BRAKE	3-23	Checks the S reel brake solenoid.
C022 : T REEL BRAKE	3-23	Checks the T reel brake solenoid.
C023 : CLEANING ROLLER	3-24	Checks the cleaning roller solenoid.
C03 : REEL/CAPSTAN MOTOR	—	
C030 : REEL/CAPSTAN MOTOR	3-25	Continuous check menu of reel and capstan motors.
C04 : DT	—	Check mode of DT
C040 : ANALOG DT	3-26	(for Analog Betacam playback-capable models) Checks the analog Betacam DT.
C041 : DIGITAL DT	3-27	Checks the digital DT.

Note

C040 : ANALOG DT will not be displayed in HDW-2000/D2000, DVW-2000/P and MSW-2000.

C1 : RF

This mode is used to check the RF system.
For more details, refer to Section 3-2-3.



```
M0:CHECK MAINTENANCE

 C0 :  SERVO/DT
*C1 :    RF
 C2 :  AUDIO/VIDEO
 C3 :  BETACAM PB
```

```
      RF CHECK MODE

 C10:SX RF CHECK
*C11:IMX RF CHECK
 C12:DB RF CHECK
 C13:HD RF CHECK
```

Title	Page	Description
C10 : SX RF CHECK	—	(for Betacam SX playback-capable models) Check mode of RF system for Betacam SX format.
C100 : PB CH CONDITION	3-29	Checks error condition of PB heads on drum of SX in PB mode.
C11 : IMX RF CHECK	—	(for MPEG IMX playback-capable models) Check mode of RF system for MPEG IMX format.
C110 : PB CH CONDITION	3-32	Checks error condition of PB heads on drum of MPEG IMX in PB mode.
C111 : REC CH CONDITION	3-35	(for MSW recorder) Checks error condition of PB heads on drum of MPEG IMX in INSERT/crash REC mode.
C12 : DB RF CHECK	—	(for Digital Betacam playback-capable models) Check mode of RF system for Digital Betacam format.
C120 : PB CH CONDITION	3-38	Checks error condition of PB heads on drum of Digital Betacam in PB mode.
C121 : REC CH CONDITION	3-41	(for DVW recorder) Checks error condition of PB heads on drum of Digital Betacam in INSERT/crash REC mode.
C13 : HD RF CHECK	—	(for HDCAM playback-capable models) Check mode of RF system for HDCAM format.
C130 : PB CH CONDITION	3-44	Checks error condition of PB heads on drum of HDCAM in PB mode.
C131 : REC CH CONDITION	3-47	(for HDW recorder) Checks error condition of PB heads on drum of HDCAM in INSERT/crash REC mode.

Note

For the HDW series, C10 : SX RF CHECK, C11 : IMX RF CHECK, and C12 : DB RF CHECK are not displayed in the 24 Hz mode.

Note

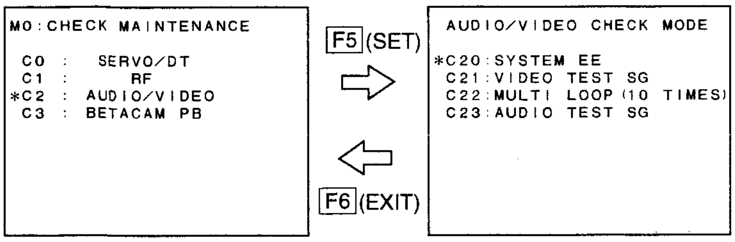
Each item is applicable to models listed below.

Title	HDW-					DVW-		MSW-		
	2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000 A2000 A2000P	M2000 M2000P M2000E M2000EP	M2100 M2100P M2100E M2100EP
	Recorder				player	Recorder		Recorder		Player
C10 : SX RF CHECK	–	–	○*1	○*1	○*1	–	○	○	○	○
C100 : PB CH CONDITION	–	–	○*1	○*1	○*1	–	○	○	○	○
C11 : IMX RF CHECK	–	○*1	○*1	–	○*1	–	○	○	○	○
C110 : PB CH CONDITION	–	○*1	○*1	–	○*1	–	○	○	○	○
C111 : REC CH CONDITION	–	–	–	–	–	–	–	○	○	–
C12 : DB RF CHECK	–	○*1	○*1	–	○*1	○	○	–	○	○
C120 : PB CH CONDITION	–	○*1	○*1	–	○*1	○	○	–	○	○
C121 : REC CH CONDITION	–	–	–	–	–	○	○	–	–	–
C13 : HD RF CHECK	○	○	○	○	○	–	–	–	–	–
C130 : PB CH CONDITION	○	○	○	○	○	–	–	–	–	–
C131 : REC CH CONDITION	○	○	○	○	–	–	–	–	–	–

*1 : Not displayed in the 24 Hz mode.

C2 : AUDIO/VIDEO

This mode is used to check the audio and video systems.
For more details, refer to Section 3-2-4.



```
M0:CHECK MAINTENANCE

 C0  :   SERVO/DT
 C1  :      RF
*C2  :  AUDIO/VIDEO
 C3  :  BETACAM PB
```

```
 AUDIO/VIDEO CHECK MODE

*C20:SYSTEM EE
 C21:VIDEO TEST SG
 C22:MULTI LOOP (10 TIMES)
 C23:AUDIO TEST SG
```

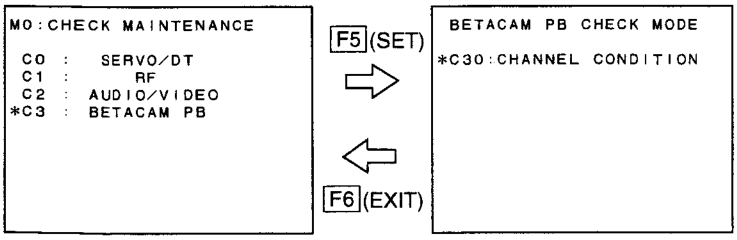
Title	Page	Description
C20 : SYSTEM EE	3-50	(for recorder) Sets the system E-E function in the maintenance mode.
C21 : VIDEO TEST SG	3-51	Sets the video test signal generator incorporated into this unit.
C22 : MULTI LOOP (10 TIMES)	3-52	(for recorder) Sets the multi-loop function in the maintenance mode.
C23 : AUDIO TEST SG	3-52	Sets the audio test signal generator incorporated into this unit.

Note

C22 : MULTI LOOP (10 TIMES) will not be displayed in HDW series.

C3 : BETACAM PB

This mode is used to check the PB system based on a Betacam/Betacam SP format.
This menu is displayed for the unit that can play back the analog Betacam.
For more details, refer to Section 3-2-5.



```
M0:CHECK MAINTENANCE

 C0  :   SERVO/DT
 C1  :      RF
 C2  :  AUDIO/VIDEO
*C3  :  BETACAM PB
```

```
 BETACAM PB CHECK MODE

*C30:CHANNEL CONDITION
```

Title	Page	Description
C30 : CHANNEL CONDITION	3-53	Checks the PB RF level condition for each video channel (Y and C) of Betacam or Betacam SP.

Note

C30 : CHANNEL CONDITION will not be displayed in HDW-2000/D2000, DVW-2000/P and MSW-2000.

3-2-2. SERVO/DT Check Mode (C0)

The C0 : SERVO/DT is used to check the servo system and DT system.

- M0 : CHECK MAINTENANCE
  - C0 : SERVO/DT
    - C00 : INPUT
      - C000 : CASSETTE SW
      - C001 : CASSETTE COMP. SW
      - C002 : TOP/END SENSOR
      - C003 : DEW SENSOR
    - C01 : MOTOR
      - C010 : S REEL
      - C011 : T REEL
      - C012 : THREADING
      - C013 : CASSETTE COMP.
      - C014 : CAPSTAN
      - C015 : DRUM
      - C016 : REEL POSITION
    - C02 : PLUNGER SOL.
      - C020 : PINCH ROLLER
      - C021 : S REEL BRAKE
      - C022 : T REEL BRAKE
      - C023 : CLEANING ROLLER
    - C03 : REEL/CAPSTAN MOTOR
      - C030 : REEL/CAPSTAN MOTOR
    - C04 : DT
      - C040 : ANALOG DT
      - C041 : DIGITAL DT

Menu Tree of Servo/DT Check Mode

Note

If a cassette tape is in the unit, the cassette tape is automatically ejected on shifting to the C0 mode.

C00 : INPUT

Check mode of various sensors

C01 : MOTOR

Check mode of motors (except a fan motor) and sensors relative to the motors

C02 : PLUNGER SOL.

Check mode of solenoids

C03 : REEL/CAPSTAN MOTOR

Check mode of S/T reel and capstan motors

C04 : DT

Check mode of DT system

C000 : CASSETTE SW

This menu checks the functions of cassette tab sensors and REC inhibit sensors (switches).

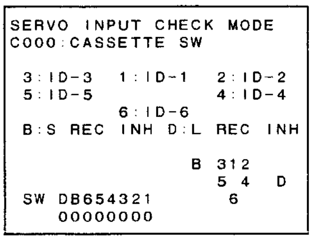
Checking

Be sure to check each sensor (switch).

(1) Push a sensor (switch) with a finger, and hold it.
  - Check the superimposed display to see that a character below the corresponding SW number changes from "0" to "1".

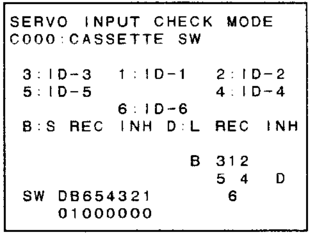
(2) Release the sensor (switch).
  - Check the superimposed display to see that above-mentioned "1" returns to "0".

(3) To finish the check, press the F6 (EXIT) button once.



```
SERVO INPUT CHECK MODE
C000:CASSETTE SW

 3:ID-3  1:ID-1  2:ID-2
 5:ID-5          4:ID-4
         6:ID-6
 B:S REC INH D:L REC INH

              B 312
                5 4  D
 SW DB654321     6
    00000000
```

(Ex.: When pushing the switch Ⓑ)



```
SERVO INPUT CHECK MODE
C000:CASSETTE SW

 3:ID-3  1:ID-1  2:ID-2
 5:ID-5          4:ID-4
         6:ID-6
 B:S REC INH D:L REC INH

              B 312
                5 4  D
 SW DB654321     6
    01000000
```

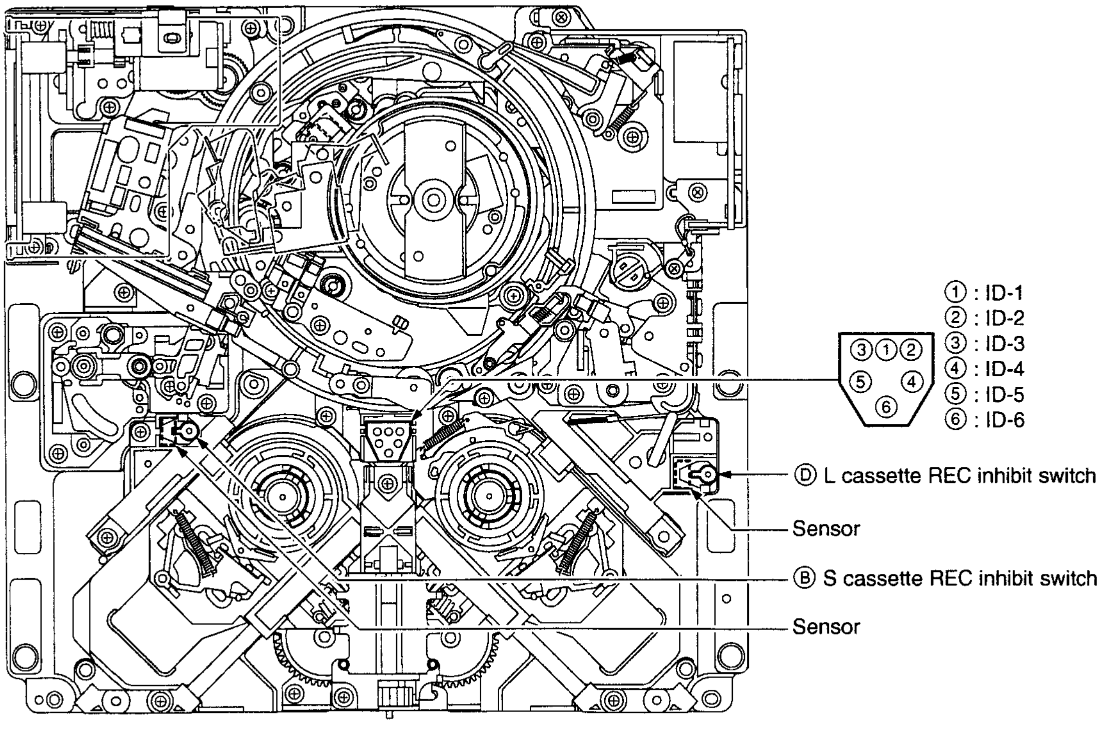
In case of NG

When any cassette tab sensor (① to ⑥) is NG :

- Check the corresponding sensor on the PTC-99 board.
- Check the corresponding sensor input port of MPU (IC100 on the DR-414/508 board).

When any REC inhibit sensor (Ⓑ and Ⓓ) is NG :

- Check the corresponding sensor on the DR-414/508 board.
- Check the corresponding sensor input port of MPU (IC100 on the DR-414/508 board).



Locations of Sensors (Switches)

C001 : CASSETTE COMP. SW

This menu checks the functions of sensors (switches) in the cassette compartment.

```
SERVO  INPUT  CHECK  MODE
C001:CASSETTE  COMP.  SW

SW1:  CASSETTE  IN  SW  1
SW2:  CASSETTE  IN  SW  2
SW3:  LARGE  CASSETTE  SW

      3  1          2
      0  0          0
```

Checking

Be sure to check each sensor (switch). These switches interlock with sensors.

Switch	Sensor
SW1 : Cassette-in switch 1	Cassette-in sensor (L)
SW2 : Cassette-in switch 2	Cassette-in sensor (R)
SW3 : L cassette detection switch	Cassette size sensor

(Ex.) When pushing SW1 in the direction of the arrow

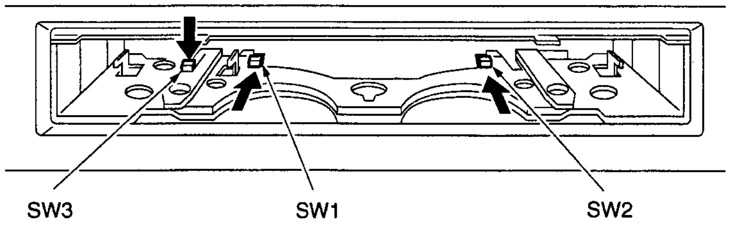
```
SERVO  INPUT  CHECK  MODE
C001:CASSETTE  COMP.  SW

SW1:  CASSETTE  IN  SW  1
SW2:  CASSETTE  IN  SW  2
SW3:  LARGE  CASSETTE  SW

      3  1          2
      0  1          0
```

(1) Push up the cassette door to the inside with your finger, and hold it.
(2) Push a switch in the direction indicated by the arrow with another finger, and hold it.
  - Check the superimposed display to see that the indication corresponding to the SW number changes from “0” to “1”.
(3) Release the switch.
  - Check to see that above-mentioned “1” returns to “0”.
(4) To finish the check, press the F6 (EXIT) button once.

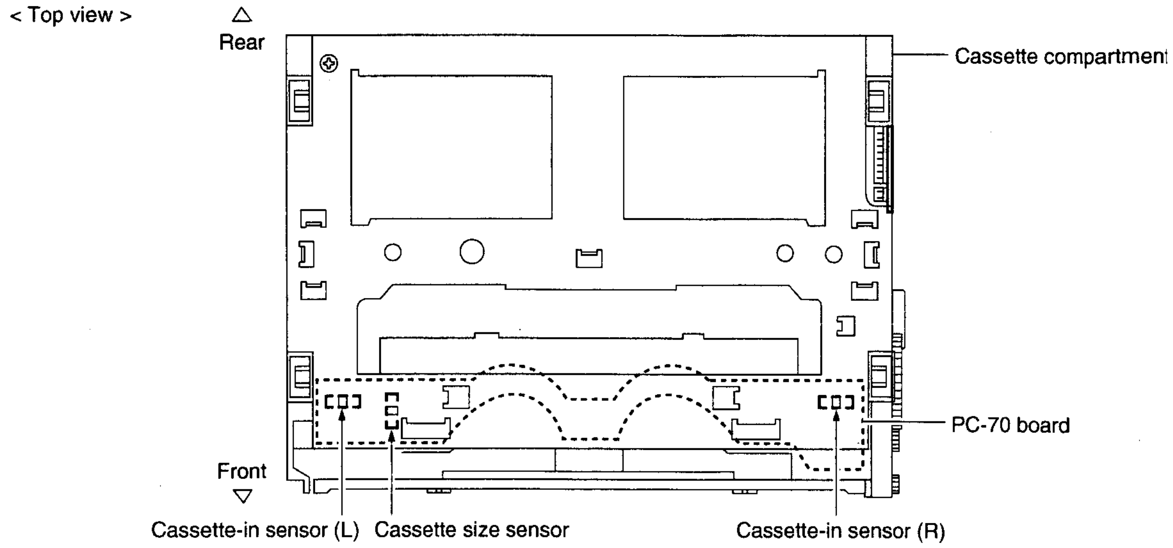
In case of NG

- Check the cassette compartment and its harness.
- Check the corresponding sensor input port of MPU (IC100 on the DR-414/508 board).

Push the cassette window up manually. Push the switch in the direction of thick arrow.



Locations of Switches in Cassette Compartment



Locations of Sensors

C002 : TOP/END SENSOR

This menu checks the functions of the tape top (beginning) sensor and the tape end sensor.

Checking

Be sure to check each sensor.

(1) Approach a metallic screwdriver to a sensor.
- Check the superimposed display to see that a character string below the corresponding sensor name changes from "OFF" to "ON".

Note

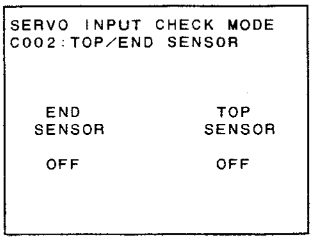
Do not bring the screwdriver into contact with each sensor.

(2) Distance the screwdriver from the sensor.
- Check to see that above-mentioned "ON" returns to "OFF".

(3) To finish the check, press the F6 (EXIT) button once.

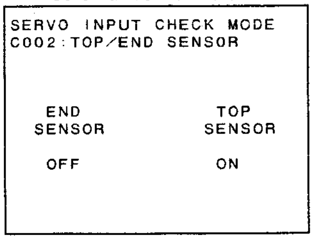
In case of NG

- Check the sensor itself.
- Check the oscillator and detection circuit on the DR-414/508 board for sensors.
- Check the corresponding sensor input port (IC103 on the SS-89 board).
  Actually, draw out the SS-89 board with the EX-739 extension board and check TP B-21 (for END sensor) and TP A-120 (for TOP sensor) on the extension board.

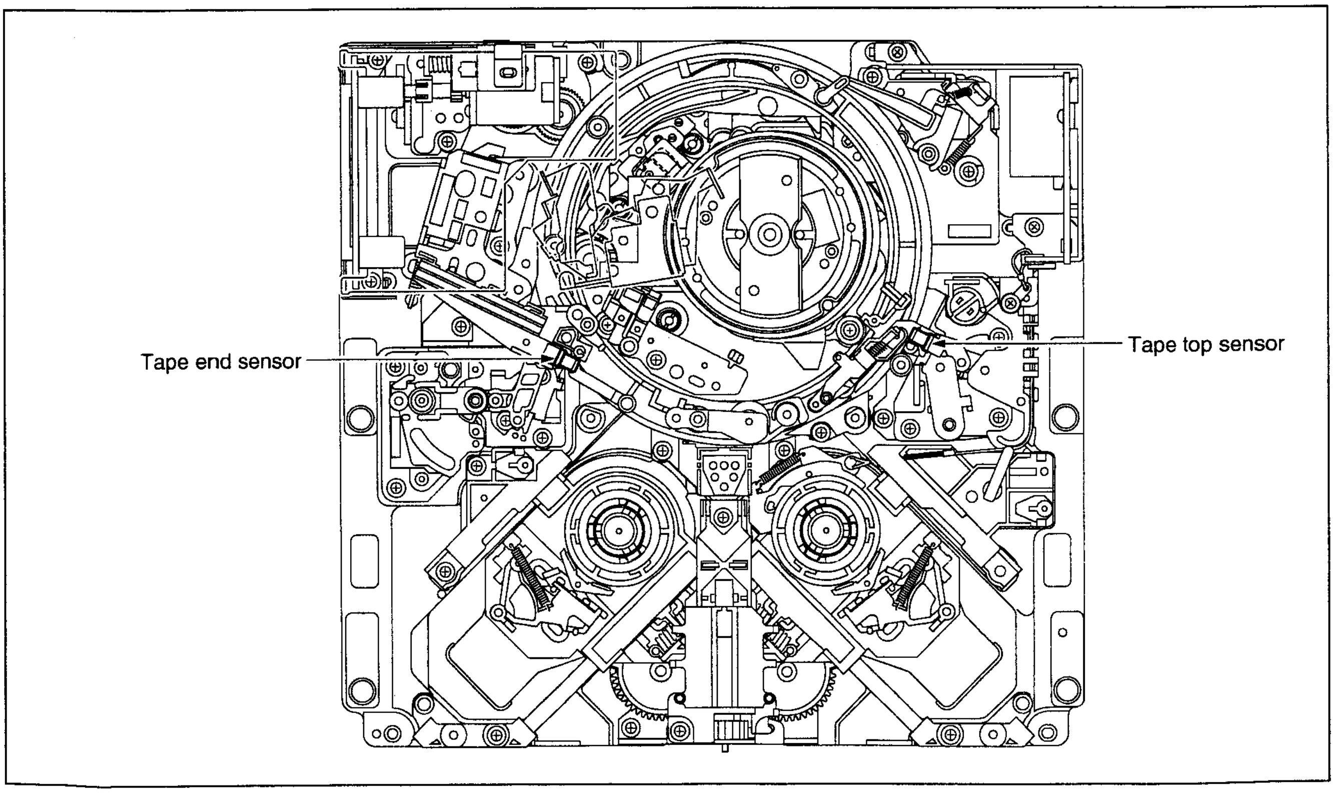


```
SERVO INPUT CHECK MODE
C002:TOP/END SENSOR

  END            TOP
 SENSOR         SENSOR

  OFF            OFF
```

(Ex.) When approaching a metalic screwdriver to the sensor



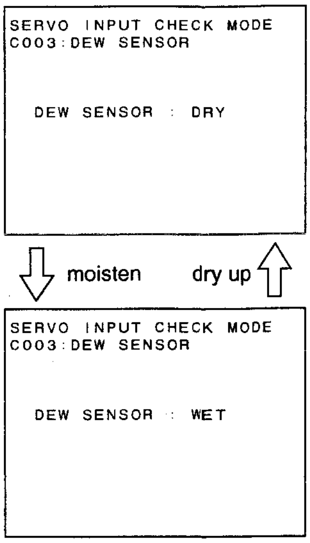
```
SERVO INPUT CHECK MODE
C002:TOP/END SENSOR

  END            TOP
 SENSOR         SENSOR

  OFF            ON
```



Locations of Tape Top/End Sensors

C003 : DEW SENSOR

This menu checks the function of a dew (condensation) sensor.



```
SERVO  INPUT  CHECK  MODE
C003 : DEW  SENSOR

    DEW  SENSOR  :  DRY
```

```
SERVO  INPUT  CHECK  MODE
C003 : DEW  SENSOR

    DEW  SENSOR  :  WET
```

Checking

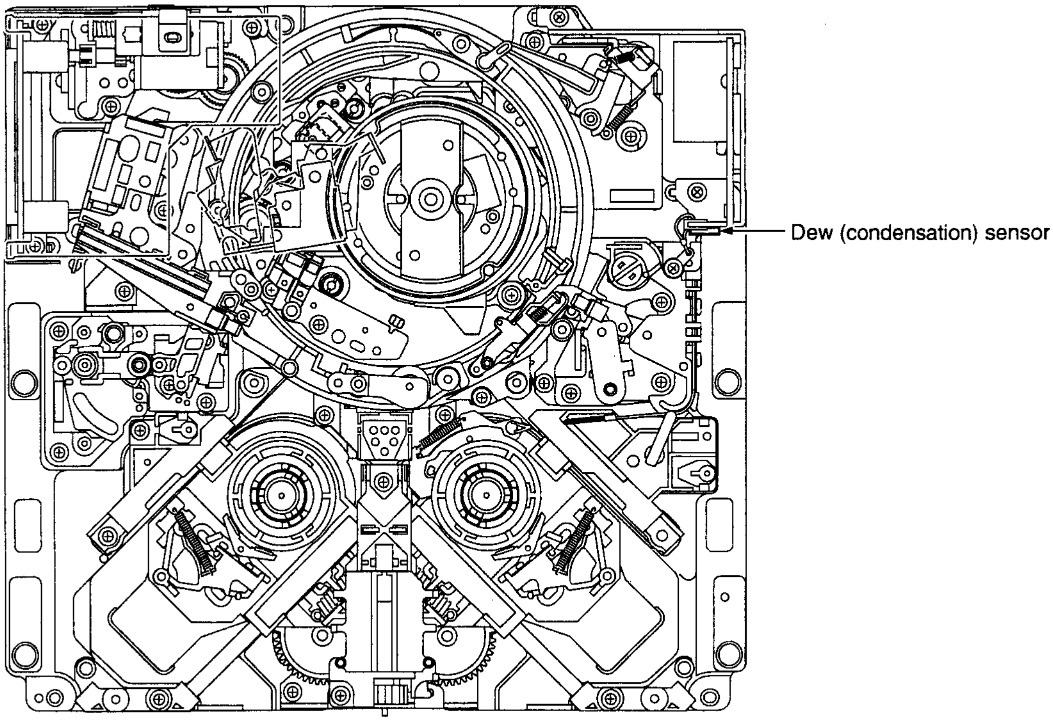
(1) Slightly touch the sensor using a cotton swab moistened by water.
  - Check the superimposed display to see that a character string changes from "DRY" to "WET".

(2) Wipe the sensor using a dry cotton swab to eliminate the moisture or evaporating the moisture completely using a blower.
  - Check to see that "WET" returns to "DRY".

(3) To finish the check, press the F6 (EXIT) button once.

In case of NG

- Check each sensor itself.
- Check the detection circuit on the DR-414/508 board.
- Check the sensor input port of MPU (IC206 on the DR-414/508 board).



Location of Dew (Condensation) Sensor

C010 : S REEL
C011 : T REEL

```
SERVO MOTOR CHECK MODE
C010:S REEL

 Turn JOG DIAL
      In JOG mode


S-REEL :   0.00(r.p.s.)
```

```
SERVO MOTOR CHECK MODE
C011:T REEL

 Turn JOG DIAL
      In JOG mode


T-REEL :   0.00(r.p.s.)
```

These menus check the function of an S reel motor or T reel motor.

Checking

(1) Turn the search dial (in JOG mode).
  - Check to see that the reel table rotates in the specified direction at a speed displayed after releasing the reel brake.

Rotating direction of search dial	Rotating direction of reel table	Superimposed display
FORWARD (↻)	Clockwise (↻)	1.00 (r. p. s)
REVERSE (↺)	Counterclockwise (↺)	−1.00 (r. p. s)

(2) Stop rotating the search dial.
  - Check to see that the reel table stops or the speed displayed on the superimposed display becomes 0.00 (r. p. s).

(3) To finish the check, press the F6 (EXIT) button once.

In case of NG

When the reel table operation is defective :

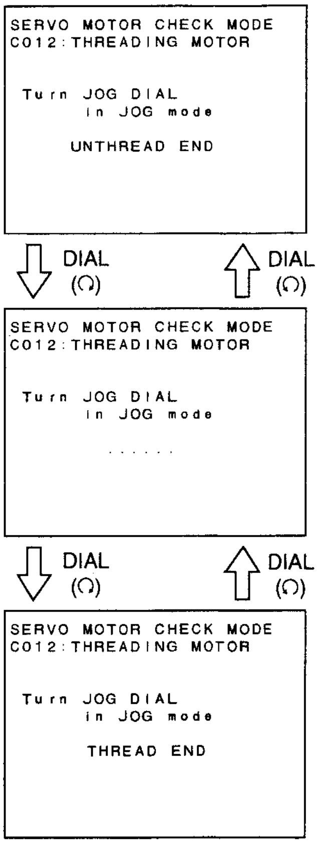
- Check the reel motor driver circuit on the DR-414/508 board.
- Check the reel motor.

When the reel table rotation is not constant at the fixed speed :

- Execute A001 : S REEL FG DUTY or A002 : T REEL FG DUTY.
- Check the FG output from a reel table FG sensor.
- Check the reel FG shaping circuit on the SS-89 board.

C012 : THREADING

This menu checks the functions of the threading motor, threading end sensor, and unthreading end sensor.



```
SERVO MOTOR CHECK MODE
C012:THREADING MOTOR

 Turn JOG DIAL
      in JOG mode

    UNTHREAD END
```

```
SERVO MOTOR CHECK MODE
C012:THREADING MOTOR

 Turn JOG DIAL
      in JOG mode

        ......
```

```
SERVO MOTOR CHECK MODE
C012:THREADING MOTOR

 Turn JOG DIAL
      in JOG mode

     THREAD END
```

Checking

(1) Turn the search dial (in JOG mode) slowly continuously in FORWARD (↻) direction.
- Check to see that the threading ring rotates counterclockwise (↺) and that the message on the superimposed display changes from "UNTHREAD END" to ".....".
- Check to see that the threading ring stops in the threading end state and that the message changes from "....." to "THREAD END".

Note

When the search dial pauses halfway, the threading ring also stops.

(2) Turn the search dial (in JOG mode) slowly continuously in REVERSE (↺) direction.
- Check to see that the threading ring rotates clockwise (↻) and that the message changes from "THREAD END" to ".....".
- Check to see that the threading ring stops in the unthreading end state and that the message changes from "....." to "UNTHREAD END".

Note

When the search dial pauses halfway, the threading ring also stops.

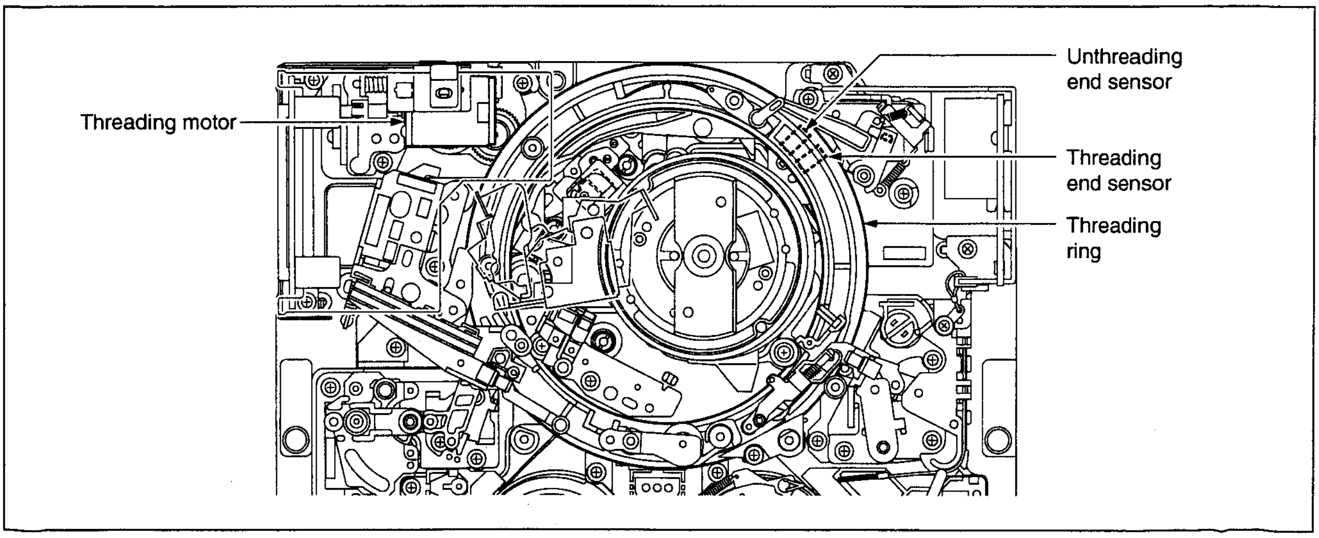
(3) To finish the check, press the F6 (EXIT) button once in the unthreading end state.

Note

Unless the unthreading end state, the threading ring will automatically return to the unthreading end position on pressing the F6 (EXIT) button.

In case of NG

- Check the mechanical abnormality.
- Check the threading motor driver circuit on the DR-414/508 board.
- Check the threading motor.
- Check the threading end sensor or unthreading end sensor on the TR-120 board.
- Check the sensor input port of MPU (IC103 on the SS-89 board).



Locations of Threading End and Unthreading End Sensors

C013 : CASSETTE COMP.

This menu checks the functions of a cassette compartment motor and cassette-down sensor.

CAUTION

Be careful not to execute this menu with your finger or the foreign matter put into the cassette compartment.

When a cassette tape is located in the cassette insertion slot, remove the cassette tape. If this menu executes without removing, the cassette tape will be caught halfway.

Notes

- If the cassette compartment has stopped halfway due to abnormality, "HORIZONTAL" or "VERTICAL" will be displayed on the superimposed display on selecting this menu.
- The power supply to the motor stops to protect the motor and movable parts when the driving time of the motor continuously exceeds about six seconds.

Checking

(1) When displaying "UP" on the superimposed display, press the F5 (SET) button once.
  - Check to see that the compartment goes down.
  - Check to see that "UP" changes as follows :
    UP ⇨ HORIZONTAL ⇨ VERTICAL ⇨ DOWN

(2) When displaying "DOWN" , press the F5 (SET) button once.
  - Check to see that the compartment goes up.
  - Check to see that "DOWN" changes as follows :
    DOWN ⇨ VERTICAL ⇨ HORIZONTAL ⇨ UP

(3) To finish the check, press the F6 (EXIT) button once.

In case of NG

- Check the mechanical abnormality.
- Check the cassette compartment motor driver circuit on the DR-414/508 board.
- Check the cassette compartment motor.
- Check the sensor input port of MPU (IC100 on the DR-414/508 board).

```
SERVO MOTOR CHECK MODE
C013:CASSETTE COMP.

        PUSH SET (FOR DOWN)

        UP
```

⇩ F5 (SET)

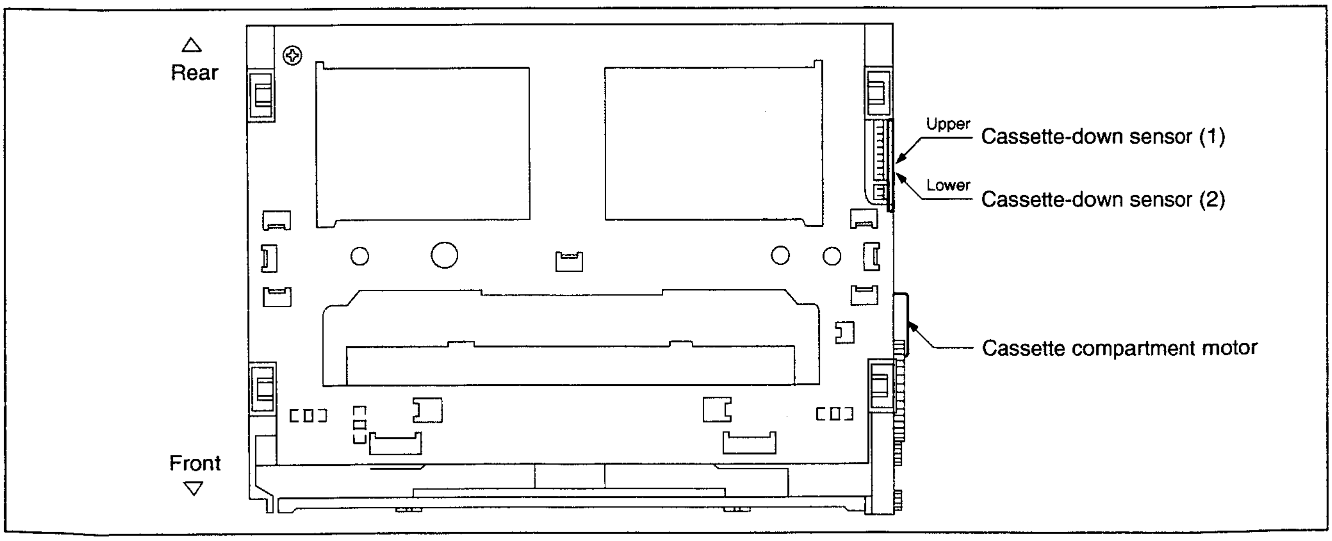
```
SERVO MOTOR CHECK MODE
C013:CASSETTE COMP.



        HORIZONTAL
```

⇩

```
SERVO MOTOR CHECK MODE
C013:CASSETTE COMP.



        VERTICAL
```

⇩

```
SERVO MOTOR CHECK MODE
C013:CASSETTE COMP.

        PUSH SET (FOR UP)

        DOWN
```



Top View of Cassette Compartment

C014 : CAPSTAN

This menu checks the function of the capstan motor.

```
SERVO MOTOR CHECK MODE
C014:CAPSTAN

     PUSH SET
```

⇩ F5 (SET)

```
SERVO MOTOR CHECK MODE
C014 CAPSTAN

     PUSH SET


    FORWARD...

CAPSTAN:  2.65 (r.p.s.)
```

⇩ After about 10 sec.

```
SERVO MOTOR CHECK MODE
C014:CAPSTAN

     PUSH SET


    FORWARD...OK

CAPSTAN:  0.00 (r.p.s.)
```

Checking

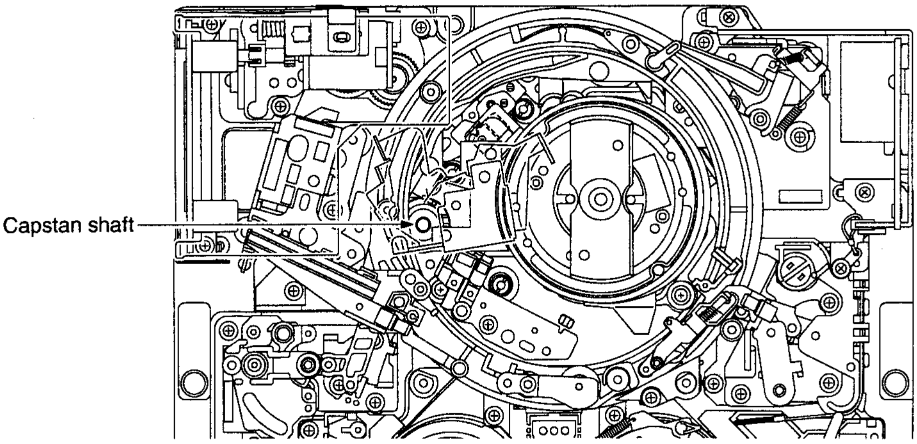
(1) Press the F5 (SET) button.
- Check to see that a capstan shaft rotates in the forward (↻) direction.
- Check to see that the capstan shaft stops after displaying a message "FORWARD...OK" on the superimposed display.

(2) Press the F5 (SET) button again.
- Check to see that the capstan shaft rotates in the reverse (↺) direction.
- Check to see that the capstan shaft stops after displaying a message "REVERSE...OK" on the superimposed display.

(3) To finish the check, press the F6 (EXIT) button once.

In case of NG

- Check the mechanical abnormality.
- Check the capstan motor driver circuit on the DR-414/508 board.
- Check the FG output from the capstan motor.
- Check the capstan FG shaping circuit on the SS-89 board.
- Check each circuit that processes the capstan FG on the SS-89 board.
- Check the capstan motor.



(Unthreading end state)

Location of Capstan Shaft

C015 : DRUM

This menu checks the function of the drum motor.

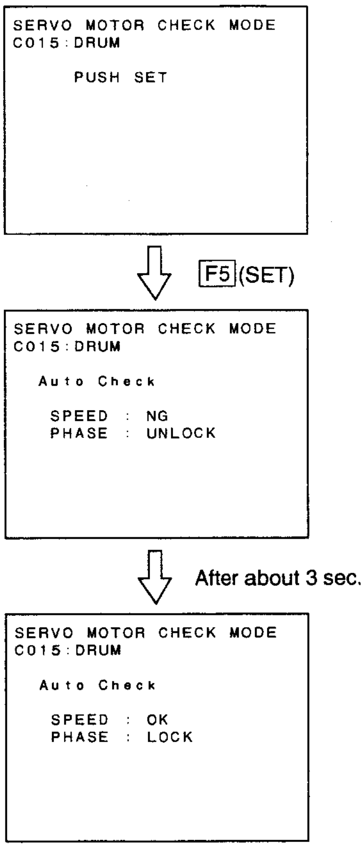
Checking

(1) Press the F5 (SET) button.
- Check to see that the drum rotates.
- Check to see that the superimposed display changes as shown on the right.

(2) To finish the check, press the F6 (EXIT) button once.
- Check to see that the drum stops.

In case of NG

- Check the mechanical abnormality.
- Check the drum motor driver circuit on the DR-414/508 board.
- Check the FG and PG outputs from the drum motor.
- Check the drum FG/PG shaping circuit on the DR-414/508 board.
- Check each circuit that processes the drum FG/PG on the SS-89 board.



```
SERVO MOTOR CHECK MODE
C015:DRUM

     PUSH SET
```

```
SERVO MOTOR CHECK MODE
C015:DRUM

  Auto Check

   SPEED  : NG
   PHASE  : UNLOCK
```

```
SERVO MOTOR CHECK MODE
C015:DRUM

  Auto Check

   SPEED  : OK
   PHASE  : LOCK
```

C016 : REEL POSITION

This menu checks the functions of the reel shift motor and two reel position sensors.

Note

The power supply to the motor stops to protect the motor and movable parts when the driving time of the motor continuously exceeds about six seconds.

Checking

(1) When displaying “S-POSITION” on the superimposed display, press the F5 (SET) button once.
- Check to see that an S and T reel tables move from the S position (S cassette position) to the L position (L cassette position).
- Check to see that “S-POSITION” changes as follows :
  S-POSITION ⇨ ..... ⇨ L-POSITION

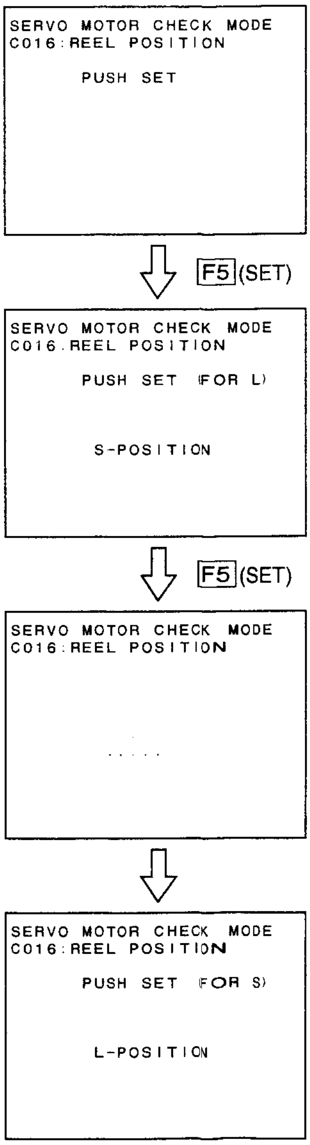
(2) When displaying “L-POSITION”, press the F5 (SET) button once.
- Check to see that the S and T reel tables move from the L position (L cassette position) to the S position (S cassette position).
- Check to see that “L-POSITION” changes as follows :
  L-POSITION ⇨ ..... ⇨ S-POSITION

(3) To finish the check, press the F6 (EXIT) button once.

In case of NG

When the reel table (reel shift motor) operation is defective :
- Check the mechanical abnormality.
- Check the reel shift motor driver circuit on the DR-414/508 board.
- Check the reel shift motor.

When the super imposed display does not indicate the actual status even through the reel tables is located in the S cassette or L cassette position :
- Check the S or T position sensor on the DR-414/508 board.
- Check the sensor input port of MPU (IC100 on the DR-414/508 board).



```
SERVO MOTOR CHECK MODE
C016:REEL POSITION

      PUSH SET
```

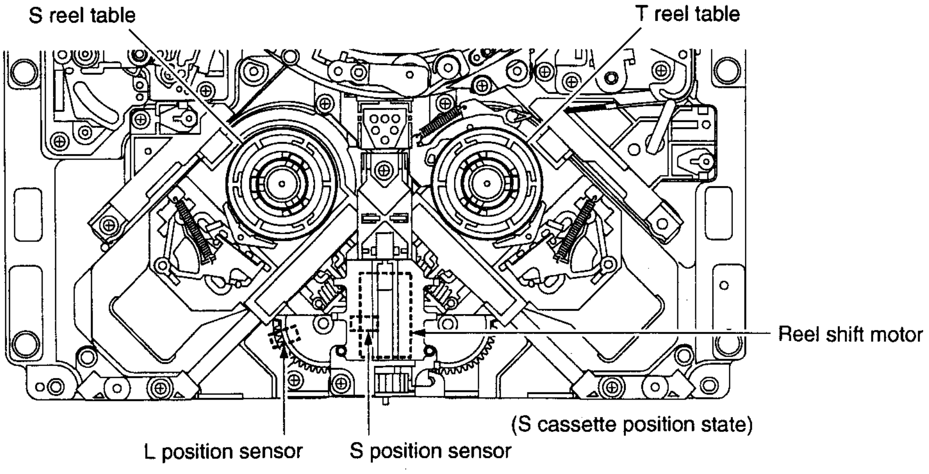
F5 (SET)

```
SERVO MOTOR CHECK MODE
C016.REEL POSITION

      PUSH SET (FOR L)


      S-POSITION
```

F5 (SET)

```
SERVO MOTOR CHECK MODE
C016:REEL POSITION




        .....
```

```
SERVO MOTOR CHECK MODE
C016:REEL POSITION

      PUSH SET (FOR S)


      L-POSITION
```



Locations of S and L Position Sensors and Reel Shift Motor

C020 : PINCH ROLLER

This menu checks the function of the pinch roller solenoid.

```
SERVO PLUNGER CHECK MODE
 C020:PINCH ROLLER

      PUSH SET
```

⇩ F5 (SET)

```
SERVO PLUNGER CHECK MODE
 C020:PINCH ROLLER

      PUSH SET (FOR ON)


        PINCH: OFF
```

F5 (SET) ⇧ ⇩ F5 (SET)

```
SERVO PLUNGER CHECK MODE
 C020:PINCH ROLLER

      PUSH SET (FOR OFF)


        PINCH: ON
```

Checking

(1) Press the F5 (SET) button.
Check that the threading ring rotates and stops at the thread end position and "PUSH SET (FOR ON)" and "PINCH : OFF" are displayed.

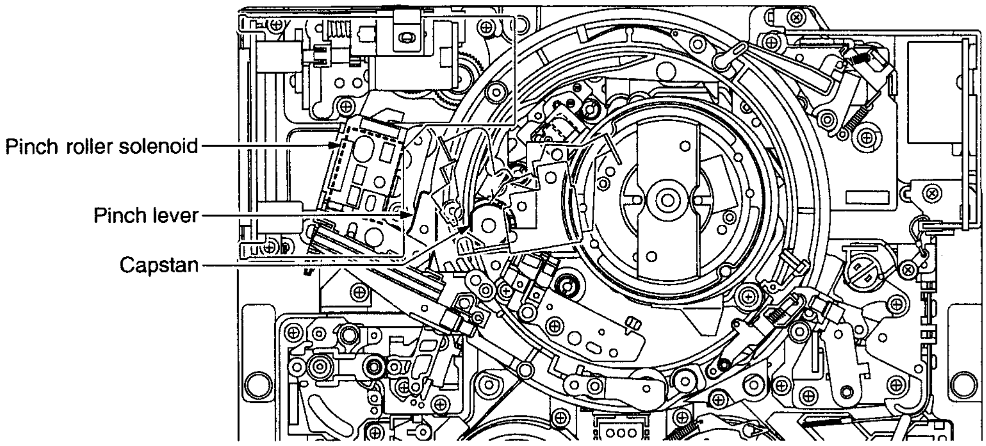
(2) Press the F5 (SET) button.
"PINCH : OFF" changes to "PINCH : ON".
Check the click sound generated by mechanism when the pinch roller solenoid is activated.

(3) Press the F5 (SET) button.
"PINCH : ON" changes to "PINCH : OFF".
Check that the pinch roller solenoid is released.

(4) Press the F6 (EXIT) button to finish the check.
Check that the pinch roller solenoid is released and the threading ring returns to the unthreading end position.

In case of NG

- Check the mechanical abnormality.
- Check the pinch roller solenoid driver circuit on the DR-414/508 board.
- Check the pinch roller solenoid itself.



(Unthreading end state)

Locations of Pinch Roller Solenoid and Pinch Lever

C021 : S REEL BRAKE
C022 : T REEL BRAKE

These menus check the function of the S or T reel brake solenoid.

Checking

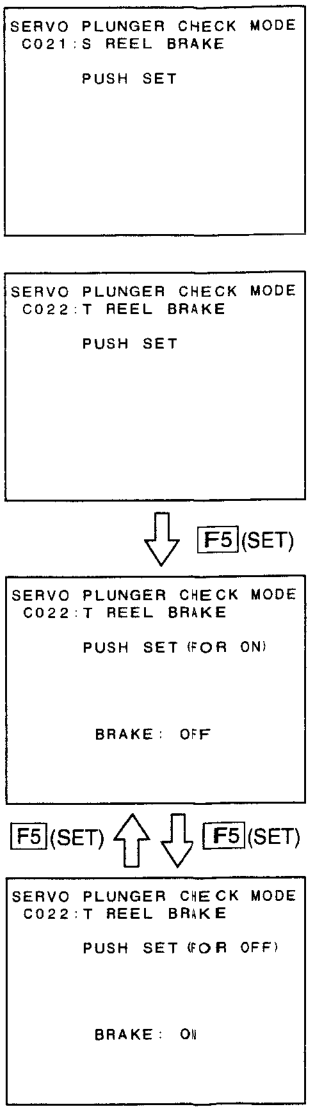
(1) Press the F5 (SET) button.
"PUSH SET" and "BRAKE : OFF" are displayed.
Check a click sound when the reel brake solenoid is activated.
Check that the reel table can be smoothly turned with a hand because the brake is released.

(2) Press the F5 (SET) button.
"BRAKE : OFF" changes to "BRAKE : ON".
Check that the brake is applied to the reel table by attempting to turn the reel table by fingers.

(3) Press the F6 (EXIT) button to finish the check.

In case of NG

- Check the mechanical abnormality.
- Check the reel brake solenoid driver circuit on the DR-414/508 board.
- Check the reel brake solenoid itself.

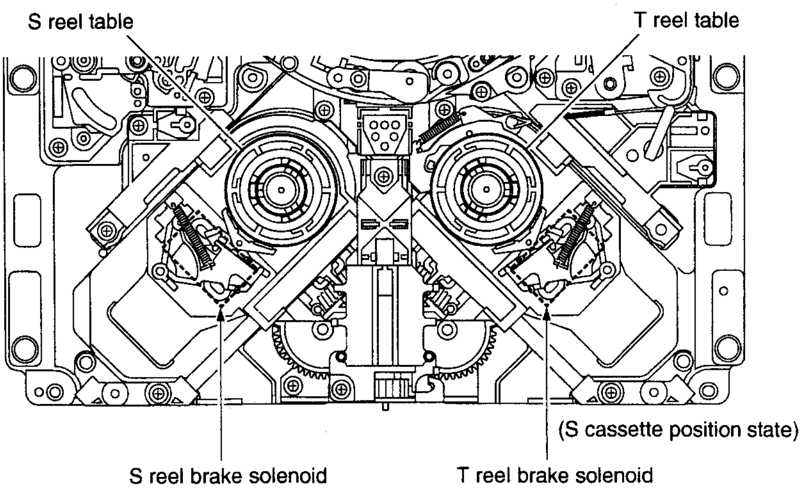


```
SERVO PLUNGER CHECK MODE
 C021:S REEL BRAKE

      PUSH SET
```

```
SERVO PLUNGER CHECK MODE
 C022:T REEL BRAKE

      PUSH SET
```

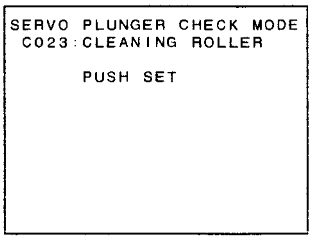
```
SERVO PLUNGER CHECK MODE
 C022:T REEL BRAKE

      PUSH SET (FOR ON)


        BRAKE: OFF
```

```
SERVO PLUNGER CHECK MODE
 C022:T REEL BRAKE

      PUSH SET (FOR OFF)


        BRAKE: ON
```



Locations of Reel Brake Solenoids

C023 : CLEANING ROLLER



```
SERVO PLUNGER CHECK MODE
 C023:CLEANING ROLLER

          PUSH SET
```

This menu checks the function of the cleaning roller solenoid.

CAUTION

While checking, the drum is rotating. So never touch the drum.

Checking

(1) Press the F5 (SET) button.

Check to see that the cleaning roller momentarily touches the drum and then away from the drum at once.

CAUTION

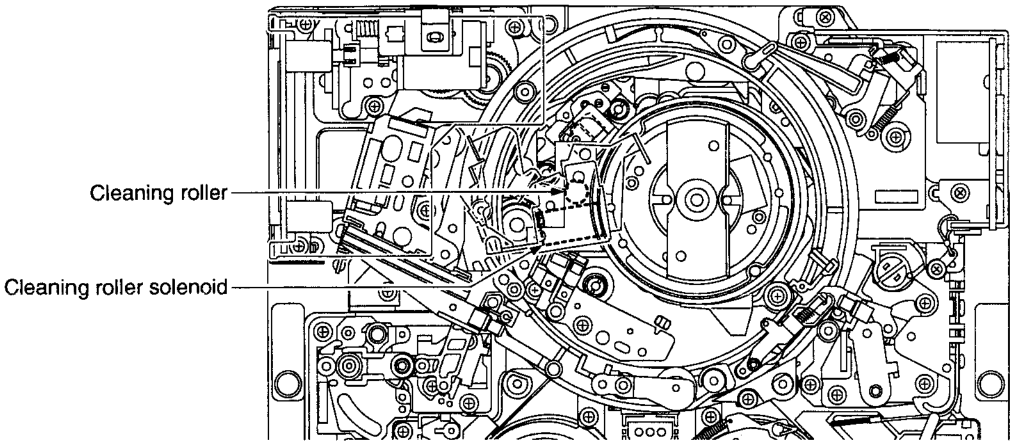
The cleaning roller solenoid causes burning when it remains activating.
If the cleaning roller is not away from the drum, turn off the power immediately.

(2) To finish the check, press the F6 (EXIT) button once.

- The drum rotation will stop.

In case of NG

- Check the mechanical abnormality.
- Check the cleaning roller solenoid driver circuit on the DR-414/508 board.
- Check the cleaning roller solenoid itself.



(Unthreading end state)

Locations of Cleaning Roller and Cleaning Roller Solenoid

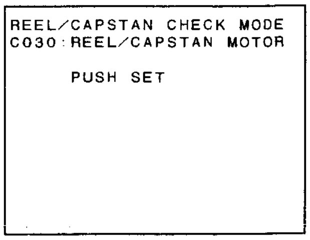
C030 : REEL/CAPSTAN MOTOR

This menu checks the following items by performing the same operations as the adjusting menus from A000 to A006.

- If automatic adjustment is possible in each menu of A000 to A006.
- If the adjustment data value obtained by the automatic adjustment is proper.

Note

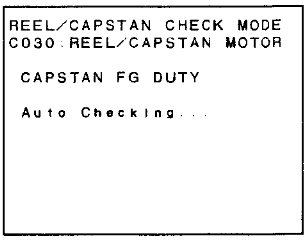
After exiting this menu, the adjustment data value will be returned to the original value.
When actually performing the adjustment, execute the adjusting menu.



```
REEL/CAPSTAN CHECK MODE
C030:REEL/CAPSTAN MOTOR

     PUSH SET
```

F5 (SET)

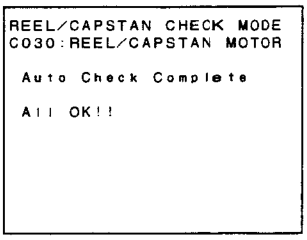
(1) Press F5 (SET) button.
  - When F5 (SET) button is pressed, checking will be started.
  - "Auto Checking..." will be displayed on the superimposed display.



```
REEL/CAPSTAN CHECK MODE
C030:REEL/CAPSTAN MOTOR

 CAPSTAN FG DUTY

 Auto Checking...
```

(omitted)

(2) Check the checking result.
  - When checking completes with no errors, "All OK" will be displayed on the superimposed display.
  - When checking could not be performed or the displays of NG items are displayed, refer to "For Automatic Adjustment Failure (A000 to A00B)" on page 3-66.



```
REEL/CAPSTAN CHECK MODE
C030:REEL/CAPSTAN MOTOR

 Auto Check Complete

 All OK!!
```

(3) Press F6 (EXIT) button to exit the menu.

C040 : ANALOG DT

This menu checks the operation of the DT head for analog Betacam playback. This menu is displayed for the unit that can play back the analog Betacam.

To execute the check

(1) Insert the alignment tape CR5-1B, then cue up it to the time code 14 : 00.
(2) Press the F5 (SET) button.
- The alignment tape will be ejected automatically.

(3) A message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape.
- The check starts automatically when inserting the alignment tape.
- During the automatic check, a message "AUTO CHECKING..." will be displayed on the superimposed display.

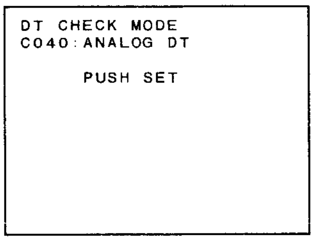
(4) Check the result of checking.
- On completing the automatic check, a message "AUTO CHECK COMPLETE" will be displayed.
- If the automatic check fails, a message "AUTO CHECK FAILURE" is displayed. In this case, refer to "When failing the automatic check".

(5) To exit the menu, press the F6 (EXIT) button once.
- The cassette tape will automatically be ejected in exiting the menu.

When failing the automatic check

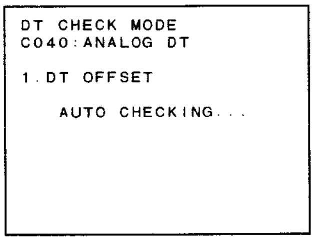
If the message "AUTO CHECK FAILURE" is displayed during the automatic check, perform the following check.
(1) Check the bimorph driving circuit on the DT-47 board.
(2) Check the bimorph driving circuit on the SS-89 board.
(3) Check the signal transmission system (slip ring etc.).

Example of display and operation



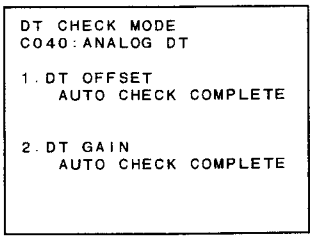
```
DT CHECK MODE
C040:ANALOG DT

      PUSH SET
```

(2) ⇩ F5 (SET)
(3) ⇩ Insert the alignment tape



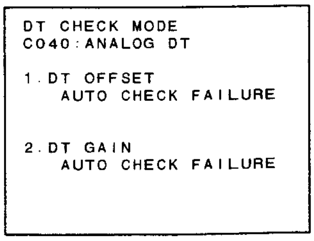
```
DT CHECK MODE
C040:ANALOG DT

1.DT OFFSET

     AUTO CHECKING...
```

⇩



```
DT CHECK MODE
C040:ANALOG DT

1.DT OFFSET
     AUTO CHECK COMPLETE

2.DT GAIN
     AUTO CHECK COMPLETE
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)



```
DT CHECK MODE
C040:ANALOG DT

1.DT OFFSET
     AUTO CHECK FAILURE

2.DT GAIN
     AUTO CHECK FAILURE
```

When failing the automatic check

C041 : DIGITAL DT

This menu checks the operation of the DT head for digital format playback.

(1) Insert the following alignment tape, then cue up it to the time code 10 : 00.

for HDW series:	HR5-1A
for DVW series (NTSC):	ZR5-1
for DVW series (PAL):	ZR5-1P
for MSW series (NTSC):	MR5-1
for MSW series (PAL):	MR5-1P

(2) Press the F5 (SET) button.
- The alignment tape will be ejected automatically.

(3) A message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape.
- The check starts automatically when inserting the alignment tape.
- During the check, a message "AUTO CHECKING..." will be displayed.

(4) Check the result of checking.
- On completing the check, a message "AUTO CHECK COMPLETE" will be displayed.
- If the check fails, a message "AUTO CHECK FAILURE" will be displayed. In this case, refer to "When failing the automatic check".

(5) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation

```
DT CHECK MODE
C041:DIGITAL DT

     PUSH SET
```

(2) ⇩ F5 (SET)

(3) ⇩ Insert the alignment tape

```
DT CHECK MODE
C041:DIGITAL DT

1.DT OFFSET

  AUTO CHECKING...
```

⇩

```
DT CHECK MODE
C041:DIGITAL DT

1.DT OFFSET
   AUTO CHECK COMPLETE

2.DT GAIN
   AUTO CHECK COMPLETE
```

(4) ⇩ Check

(5) ⇩ F6 (EXIT)

When failing the automatic check

If the message "AUTO CHECK FAILURE" is displayed during the check, perform the following check.

(1) Check the bimorph driving circuit on the DT-47 board.

(2) Check the bimorph driving control circuit on the SS-89 board.

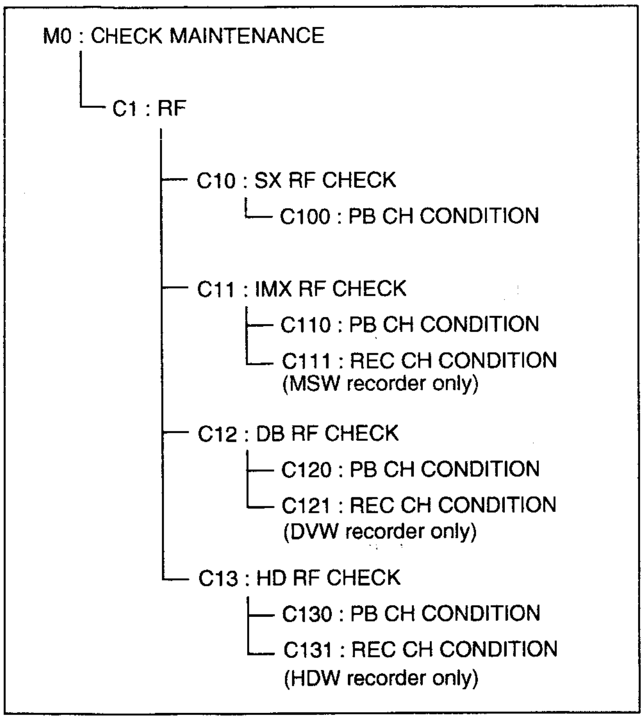
(3) Check the signal transmission system such as slip ring.

```
DT CHECK MODE
C041:DIGITAL DT

1.DT OFFSET
   AUTO CHECK FAILURE

2.DT GAIN
   AUTO CHECK FAILURE
```

When failing the automatic check

3-2-3. RF Check Mode (C1)

The C1 : RF mode is used to check the PB RF system based on various digital recording formats.


M0 : CHECK MAINTENANCE
C1 : RF
C10 : SX RF CHECK
C100 : PB CH CONDITION
C11 : IMX RF CHECK
C110 : PB CH CONDITION
C111 : REC CH CONDITION (MSW recorder only)
C12 : DB RF CHECK
C120 : PB CH CONDITION
C121 : REC CH CONDITION (DVW recorder only)
C13 : HD RF CHECK
C130 : PB CH CONDITION
C131 : REC CH CONDITION (HDW recorder only)

Menu Tree of RF Check Mode

Note

If abnormally exists in the servo system, each menu in C1 : RF mode does not function properly.

C10 : SX RF CHECK

This mode checks the PB RF system for the SX format tape.

This menu is displayed for the models that can play back the Betacam SX.

C11 : IMX RF CHECK

This mode checks the PB RF system for the MPEG IMX format tape.

This menu is displayed for the models that can play back the MPEG IMX.

C12 : DB RF CHECK

This mode checks the PB RF system for the Digital Betacam format tape.

This menu is displayed for the models that can play back the Digital Betacam.

C13 : HD RF CHECK

This mode checks the PB RF system for the HDCAM format tape.

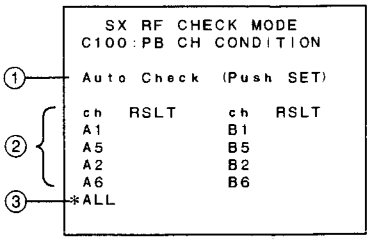
This menu is displayed for the models that can play back the HDCAM.

C100 : PB CH CONDITION

This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when a tape recorded in Betacam SX format is played back by tracking.
This menu is displayed for the unit that can play back the Betacam SX.

Notes

- A cassette tape recorded in other format is automatically ejected.
- During normal operation, the tape is played back by non-tracking. Therefore, the condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, the menus of C1 : RF do not function properly.



```
  SX RF CHECK MODE
C100:PB CH CONDITION

Auto Check  (Push SET)

ch  RSLT       ch  RSLT
A1             B1
A5             B5
A2             B2
A6             B6
*ALL
```

Description of superimposed display

① The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) : Requesting to press the F5 (SET) button to initiate the check.
Auto Checking... : Check is in progress.
Auto Check Complete : Check is completed.
Auto Check Failure : Check failure
Condition NG : Error condition defect
Insert SR5-1 : Requesting to insert a specified alignment tape.

② To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Notes

- "RSLT" indicates the result.
- A1, B1, A5 and B5 are heads for Betacam SX format.
- A2, B2, A6 and B6 are the same confidence heads A, B, C and D for MPEG IMX format.

③ To check the conditions for all channels at a time, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ②.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

To execute the C100 : PB CH CONDITION check (for SX)

(1) Insert a cassette tape recorded in SX format. The alignment tape SR5-1 (for 525 mode) or SR5-1P (for 625 mode) is recommended.

Notes

- To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion more than a check execution time.
  The check execution time is usually about ten seconds in each channel check and about 80 seconds in an ALL check.
- Use the alignment tape SR5-1 (for 525 mode) or SR5-1P (for 625 mode) usually.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the PLAY mode.
- During the check, the message "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than PLAY mode.
  If the unit enters into other mode than PLAY mode, the check freezes or the condition becomes "RED".

(4) Check to see the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C100)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C100)" on next page.

Notes

- If the check results for all channels are "RED" when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C100)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

Note

To change the cassette tape before starting the check, press the F5 (SET) button while pressing the EJECT button.
The tape is then ejected without influencing the check result. Insert another cassette tape and press the PLAY button. The check is then initiated. This operation does not coincide with the message on the superimposed display.

Example of display and operation

When ALL is selected in C100 : PB CH CONDITION.

Superimposed display

```
      SX RF CHECK MODE
 C100:PB CH CONDITION

 Auto Check (Push SET)

 ch   RSLT      ch   RSLT
 A1             B1
 A5             B5
 A2             B2
 A6             B6
*ALL
```

(1) ⇩ Insert SR5-1/SR5-1P
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5 (SET)

```
      SX RF CHECK MODE    □
 C100:PB CH CONDITION

 Auto Checking ...

 ch   RSLT      ch   RSLT
 A1             B1
 A5             B5
 A2             B2
 A6             B6
*ALL
```

⇩

```
      SX RF CHECK MODE    □
 C100:PB CH CONDITION

 Auto Check Complete

 ch   RSLT      ch   RSLT
 A1   GRN       B1
 A5             B5
 A2             B2
 A6             B6
*ALL
```

⇩

```
      SX RF CHECK MODE    □
 C100:PB CH CONDITION

 Auto Checking ...

 ch   RSLT      ch   RSLT
 A1   GRN       B1
 A5             B5
 A2             B2
 A6             B6
*ALL
```

⇩

(omitted)

⇩

```
      SX RF CHECK MODE
 C100:PB CH CONDITION

 Auto Check Complete

 ch   RSLT      ch   RSLT
 A1   GRN       B1   GRN
 A5   GRN       B5   GRN
 A2   GRN       B2   GRN
 A6   GRN       B6   GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)

For Check Failure (C100)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure will occur on the tape recorded in the failed Betacam SX VTR. Confirm that the tape can be correctly played back in the other normal operating Betacam SX VTR.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C100)".
   - Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush/slip ring assembly defect or its part installation/ connection defect
     ⇨ Replace or reinstall the brush/slip ring assembly
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A10 : SX RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C100)

Recheck according to the procedures below.

(1) If a check is performed without using alignment tape SR5-1/SR5-1P, recheck in the menu C100 using the alignment tape SR5-1/SR5-1P.
When no abnormality is found, the check is completed.

Note

When no abnormality is found during the check using the alignment tape, a trouble (tape is damaged or recording is not done properly) is considered to exist on the tape portion used in the previous check.

(2) Change the playback portion on the alignment tape.
Recheck in the menu C100. When no abnormality is found, the check is completed.

(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C100 using the alignment tape.
When no abnormality is found, the check is completed.

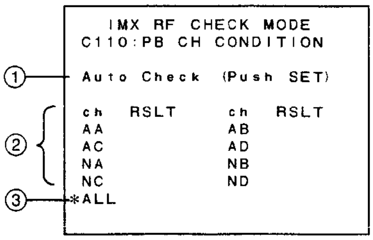
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds)
Recheck in the menu C100 using the alignment tape.
When no abnormality is found, the check is completed.

(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C100 using the alignment tape.
When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system.
  A00 : SERVO ADJUST
  ⇨ Check the servo system.
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- RF system adjustment defect
  ⇨ Readjust the RF system. (A10 : SX RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport system, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C110 : PB CH CONDITION



```
IMX RF CHECK MODE
C110:PB CH CONDITION
Auto Check (Push SET)
ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when a tape recorded in MPEG IMX format is played back by tracking.

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, the menus of C1 : RF do not function properly.

Description of superimposed display

① The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) :	Requesting to press the F5 (SET) button to initiate the check.
Auto Checking... :	Check is in progress.
Auto Check Complete :	Check is completed.
Auto Check Failure :	Check failure
Condition NG :	Error condition defect
Insert MR5-1 :	Requesting to insert an alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode).

② To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Notes

- "RSLT" indicates the result.
- AA, AB, AC and AD indicate Advance head A, B, C and D repectively.
- NA, NB, NC and ND indicate Confidence head A, B, C and D respectively.

③ To check the conditions for all channels at a time, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ②.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

To execute the C110 : PB CH CONDITION check (for MPEG IMX)

(1) Insert a cassette tape recorded in MPEG IMX format. The alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode) is recommended.

Note

To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion more than a check execution time.
The check execution time is usually about ten seconds in each channel check and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the PLAY mode.
- During the check, the message "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than PLAY mode.
  If the unit enters into other mode than PLAY mode, the check freezes or the condition becomes "RED".

(4) Check to see the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C110)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C110)" on next page.

Notes

- If the check results for all channels are "RED" when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C110)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

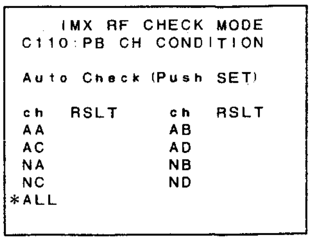
Note

To change the cassette tape before starting the check, press the F5 (SET) button while pressing the EJECT button.
The tape is then ejected without influencing the check result. Insert another cassette tape and press the PLAY button. The check is then initiated. This operation does not coincide with the message on the superimposed display.

Example of display and operation

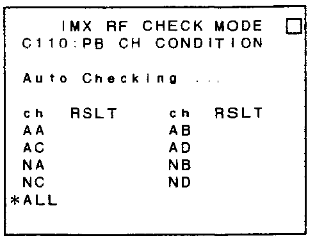
When ALL is selected in C110 : PB CH CONDITION.

Superimposed display



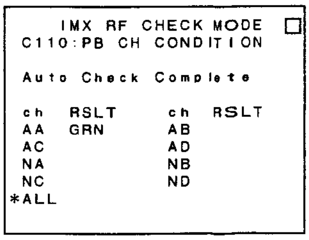
```
   IMX RF CHECK MODE
C110:PB CH CONDITION

Auto Check (Push SET)

ch  RSLT      ch  RSLT
AA            AB
AC            AD
NA            NB
NC            ND
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5 (SET)



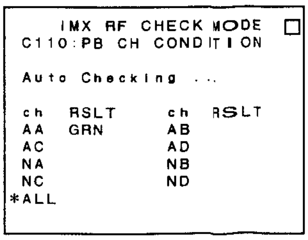
```
   IMX RF CHECK MODE □
C110:PB CH CONDITION

Auto Checking ...

ch  RSLT      ch  RSLT
AA            AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩



```
   IMX RF CHECK MODE □
C110:PB CH CONDITION

Auto Check Complete

ch  RSLT      ch  RSLT
AA  GRN       AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

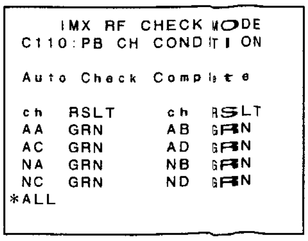


```
   IMX RF CHECK MODE □
C110:PB CH CONDITION

Auto Checking ...

ch  RSLT      ch  RSLT
AA  GRN       AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

(omitted)

⇩



```
   IMX RF CHECK MODE
C110:PB CH CONDITION

Auto Check Complete

ch  RSLT      ch  RSLT
AA  GRN       AB  GRN
AC  GRN       AD  GRN
NA  GRN       NB  GRN
NC  GRN       ND  GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)

For Check Failure (C110)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure will occur on the tape recorded in the failed MPEG IMX VTR. Confirm that the tape can be correctly played back in the other normal operating MPEG IMX VTR.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C110)".
   - Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush/slip ring assembly defect or its part installation/ connection defect
     ⇨ Replace or reinstall the brush/slip ring assembly
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A11: IMX RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C110)

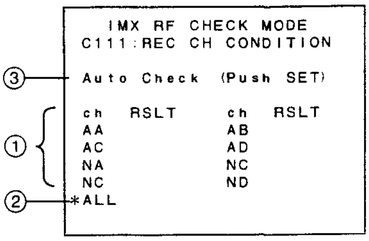
Recheck according to the procedures below.

(1) If a check is performed without using alignment tape MR5-1/MR5-1P, recheck in the menu C110 using the alignment tape MR5-1/MR5-1P.
When no abnormality is found, the check is completed.
Note
When no abnormality is found during the check using the alignment tape, a trouble (tape is damaged or recording is not done properly) is considered to exist on the tape portion used in the previous check.
(2) Change the playback portion on the alignment tape. Recheck in the menu C110. When no abnormality is found, the check is completed.
(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C110 using the alignment tape. When no abnormality is found, the check is completed.
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds)
Recheck in the menu C110 using the alignment tape. When no abnormality is found, the check is completed.
(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C110 using the alignment tape. When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system.
  A00 : SERVO ADJUST
  ⇨ Check the servo system.
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- RF system adjustment defect
  ⇨ Readjust the RF system. (A11 : IMX RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport system, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C111 : REC CH CONDITION



```
      IMX RF CHECK MODE
  C111:REC CH CONDITION
  Auto Check  (Push SET)
  ch   RSLT      ch   RSLT
  AA             AB
  AC             AD
  NA             NC
  NC             ND
 *ALL
```

This menu is displayed for the recorder of MSW series.
This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when recording on the tape recorded in MPEG IMX format in the insert REC mode and when recording in crash REC mode.
In the insert REC mode, checks using each PB signal from the advance PB heads (AA, AB, AC, and AD) by tracking.
In the crash REC mode, checks using each PB signal from the confidence PB heads (NA, NB, NC and ND).

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, this menu does not function properly.

Description of superimposed display

① To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Note

"RSLT" indicates the result.

② To check the conditions for all channels, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ①.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

③ The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) : Requesting to press the F5 (SET) button to initiate the check.
Waiting... : Tracking is in an optimization process.
Auto Checking... : Check is in progress.
Auto Check Complete : Check is completed.
Auto Check Failure : Check failure
Condition NG : Error condition defect

To execute C111 : REC CH CONDITION check

(1) Insert a record-able cassette tape recorded in MPEG IMX format.

Notes

- The recorded data on the inserted cassette tape will be rewritten to another data in this check.
- To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion than two minutes. Before check, record any video signal on the tape for two minutes or more.
- The check execution time for each channel is usually about ten seconds and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the REC mode.
- During the check, the message "Waiting ..." or "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than REC mode. If the unit enters into other mode than REC mode, the check freezes or the condition becomes "RED".

(4) Check the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C111)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C111)" on next page.

Notes

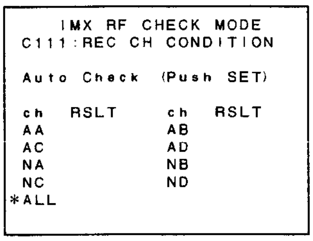
- If the check results for all channels are RED when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C111)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

Example of display and operation

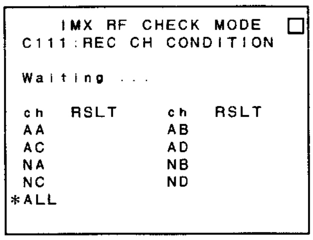
When ALL is selected in C111 : REC CH CONDITION.

Superimposed display



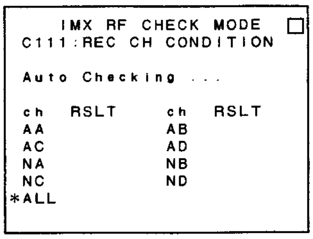
```
      IMX RF CHECK MODE
C111:REC CH CONDITION

Auto Check   (Push SET)

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

(1) ⇩ Insert a recorded tape
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5 (SET)



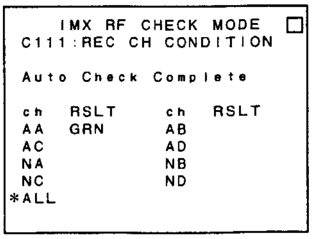
```
      IMX RF CHECK MODE  ☐
C111:REC CH CONDITION

Waiting ...

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



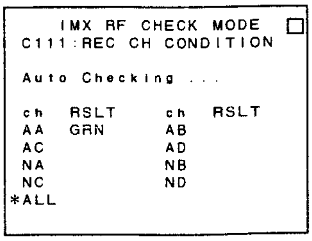
```
      IMX RF CHECK MODE  ☐
C111:REC CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



```
      IMX RF CHECK MODE  ☐
C111:REC CH CONDITION

Auto Check Complete

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



```
      IMX RF CHECK MODE  ☐
C111:REC CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

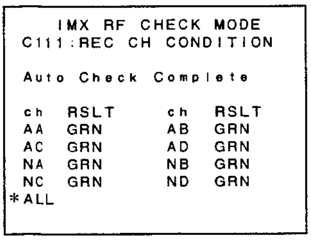
⇩

(omitted)

⇩

(continue to next page)

(continued)
⇩



```
      IMX  RF  CHECK  MODE
 C111:REC  CH  CONDITION

 Auto  Check  Complete

 ch   RSLT       ch   RSLT
 AA   GRN        AB   GRN
 AC   GRN        AD   GRN
 NA   GRN        NB   GRN
 NC   GRN        ND   GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)

For Check Failure (C111)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure occurs if using the tape recorded in otherwise than MPEG IMX format or the non-recorded tape.
   Moreover, check failure will also occur on the tape recorded in the failed MPEG IMX VTR. Execute recording by the unit to be tested and confirm that the unit can correctly play back the tape.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C111)".
     Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush slip ring assembly defect or its part installation/connection defect
     ⇨ Replace or reinstall the brush slip ring assembly.
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A11 : IMX RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C111)

Check, recheck and clean the drum according to the procedures below.

(1) Check in C110 : PB CH CONDITION with alignment tape. When the result is OK, perform (2) and later.
(2) Adjust the recording current in A112 : REC CURRENT.
Recheck in the menu C111 : REC CH CONDITION after recording any video signal again for two minutes or more.
When no abnormality is found, the check is completed.

Note

The recorded data on the tape will be overwritten in checking in the menu C111 : REC CH CONDITION.
Before the recheck, record any video signal again on the tape for two minute or more.

(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C111 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds).
Recheck in the menu C111 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C111 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

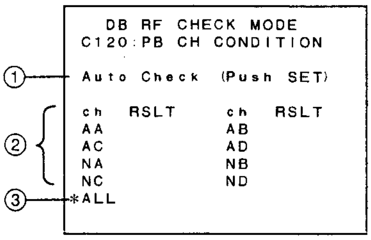
- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system
  A00 : SERVO ADJUST
  ⇨ Check the servo system
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C120 : PB CH CONDITION

This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when a tape recorded in Digital Betacam format is played back by tracking.

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, the menus of C1 : RF do not function properly.



```
  DB RF CHECK MODE
C120:PB CH CONDITION

Auto Check  (Push SET)

ch  RSLT       ch  RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

Description of superimposed display

① The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) :	Requesting to press the F5 (SET) button to initiate the check.
Auto Checking... :	Check is in progress.
Auto Check Complete :	Check is completed.
Auto Check Failure :	Check failure
Condition NG :	Error condition defect
Insert ZR5-1 :	Requesting to insert an alignment tape ZR5-1 (for 525 mode) or ZR5-1P (for 625 mode).

② To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Notes

- "RSLT" indicates the result.
- AA, AB, AC and AD indicate Advance head A, B, C and D repectively.
- NA, NB, NC and ND indicate Confidence head A, B, C and D respectively.

③ To check the conditions for all channels at a time, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ②.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

To execute the C120 : PB CH CONDITION check (for Digital Betacam)

(1) Insert a cassette tape recorded in Digital Betacam format. The alignment tape ZR5-1 (for 525 mode) or ZR5-1P (for 625 mode) is recommended.

Note

To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion more than a check execution time.
The check execution time is usually about ten seconds in each channel check and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the PLAY mode.
- During the check, the message "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than PLAY mode.
  If the unit enters into other mode than PLAY mode, the check freezes or the condition becomes "RED".

(4) Check to see the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C120)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C120)" on next page.

Notes

- If the check results for all channels are "RED" when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C120)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

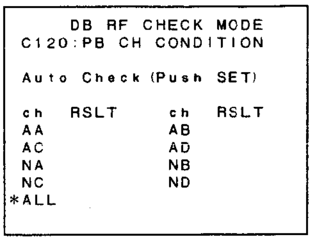
Note

To change the cassette tape before starting the check, press the F5 (SET) button while pressing the EJECT button.
The tape is then ejected without influencing the check result. Insert another cassette tape and press the PLAY button. The check is then initiated. This operation does not coincide with the message on the superimposed display.

Example of display and operation

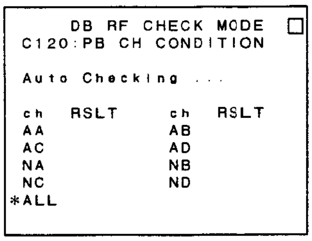
When ALL is selected in C120 : PB CH CONDITION.

Superimposed display



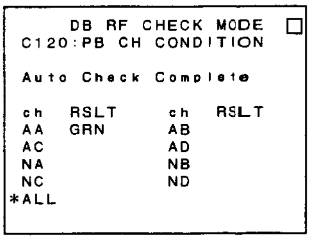
```
      DB RF CHECK MODE
 C120:PB CH CONDITION

 Auto Check (Push SET)

 ch  RSLT       ch  RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

(1) ⇩ Insert ZR5-1/ZR5-1P
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5(SET)



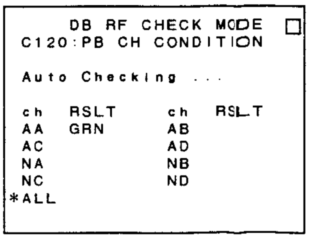
```
      DB RF CHECK MODE  □
 C120:PB CH CONDITION

 Auto Checking ...

 ch  RSLT       ch  RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

⇩



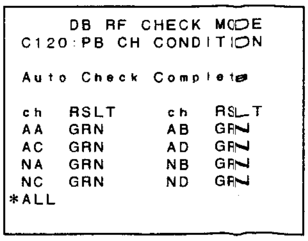
```
      DB RF CHECK MODE  □
 C120:PB CH CONDITION

 Auto Check Complete

 ch  RSLT       ch  RSLT
 AA  GRN        AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

⇩



```
      DB RF CHECK MODE  □
 C120:PB CH CONDITION

 Auto Checking ...

 ch  RSLT       ch  RSLT
 AA  GRN        AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

⇩
(omitted)
⇩



```
      DB RF CHECK MODE
 C120:PB CH CONDITION

 Auto Check Complete

 ch  RSLT       ch  RSLT
 AA  GRN        AB  GRN
 AC  GRN        AD  GRN
 NA  GRN        NB  GRN
 NC  GRN        ND  GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)

For Check Failure (C120)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure will occur on the tape recorded in the failed Digital Betacam VTR. Confirm that the tape can be correctly played back in the other normal operating Digital Betacam VTR.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C120)".
   - Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush/slip ring assembly defect or its part installation/ connection defect
     ⇨ Replace or reinstall the brush/slip ring assembly
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A12: DB RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C120)

Recheck according to the procedures below.

(1) If a check is performed without using alignment tape ZR5-1/ZR5-1P, recheck in the menu C120 using the alignment tape ZR5-1/ZR5-1P.
When no abnormality is found, the check is completed.

Note

When no abnormality is found during the check using the alignment tape, a trouble (tape is damaged or recording is not done properly) is considered to exist on the tape portion used in the previous check.

(2) Change the playback portion on the alignment tape. Recheck in the menu C120. When no abnormality is found, the check is completed.

(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C120 using the alignment tape. When no abnormality is found, the check is completed.

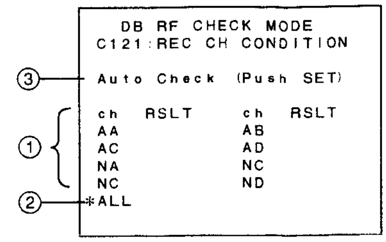
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds)
Recheck in the menu C120 using the alignment tape. When no abnormality is found, the check is completed.

(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C120 using the alignment tape. When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system.
  A00 : SERVO ADJUST
  ⇨ Check the servo system.
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- RF system adjustment defect
  ⇨ Readjust the RF system. (A12 : DB RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport system, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C121 : REC CH CONDITION



```
  DB RF CHECK MODE
C121:REC CH CONDITION

Auto Check (Push SET)

ch   RSLT     ch   RSLT
AA            AB
AC            AD
NA            NC
NC            ND
*ALL
```

This menu is displayed for the recorder of DVW series.
This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when recording on the tape recorded in Digital Betacam format in the insert REC mode and when recording in crash REC mode.
In the insert REC mode, checks using each PB signal from the advance PB heads (AA, AB, AC, and AD) by tracking.
In the crash REC mode, checks using each PB signal from the confidence PB heads (NA, NB, NC and ND).

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, this menu does not function properly.

Description of superimposed display

① To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Note

"RSLT" indicates the result.

② To check the conditions for all channels, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ①.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

③ The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) :	Requesting to press the F5 (SET) button to initiate the check.
Waiting... :	Tracking is in an optimization process.
Auto Checking... :	Check is in progress.
Auto Check Complete :	Check is completed.
Auto Check Failure :	Check failure
Condition NG :	Error condition defect

To execute C121 : REC CH CONDITION check

(1) Insert a record-able cassette tape recorded in Digital Betacam format.

Notes

- The recorded data on the inserted cassette tape will be rewritten to another data in this check.
- To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion than two minutes. Before check, record any video signal on the tape for two minutes or more.
- The check execution time for each channel is usually about ten seconds and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the REC mode.
- During the check, the message "Waiting ..." or "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than REC mode. If the unit enters into other mode than REC mode, the check freezes or the condition becomes "RED".

(4) Check the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C121)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C121)" on next page.

Notes

- If the check results for all channels are RED when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C121)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

Example of display and operation

When ALL is selected in C121 : REC CH CONDITION.

Superimposed display

```
     DB RF CHECK MODE
C121:REC CH CONDITION

Auto Check (Push SET)

ch   RSLT     ch   RSLT
AA            AB
AC            AD
NA            NB
NC            ND
*ALL
```

(1) ⇩ Insert a recorded tape
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5 (SET)

```
     DB RF CHECK MODE   □
C121:REC CH CONDITION

Waiting ...

ch   RSLT     ch   RSLT
AA            AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

```
     DB RF CHECK MODE   □
C121:REC CH CONDITION

Auto Checking ...

ch   RSLT     ch   RSLT
AA            AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

```
     DB RF CHECK MODE   □
C121:REC CH CONDITION

Auto Check Complete

ch   RSLT     ch   RSLT
AA   GRN      AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

```
     DB RF CHECK MODE   □
C121:REC CH CONDITION

Auto Checking ...

ch   RSLT     ch   RSLT
AA   GRN      AB
AC            AD
NA            NB
NC            ND
*ALL
```

⇩

(omitted)

⇩

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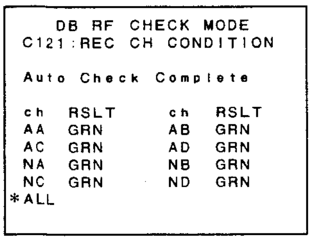
⇩



```
   DB RF CHECK MODE
C121 :REC CH CONDITION

Auto Check Complete

ch  RSLT     ch  RSLT
AA  GRN      AB  GRN
AC  GRN      AD  GRN
NA  GRN      NB  GRN
NC  GRN      ND  GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)

For Check Failure (C121)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure occurs if using the tape recorded in otherwise than Digital Betacam format or the non-recorded tape.
   Moreover, check failure will also occur on the tape recorded in the failed Digital Betacam VTR. Execute recording by the unit to be tested and confirm that the unit can correctly play back the tape.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C121)".
     Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush slip ring assembly defect or its part installation/connection defect
     ⇨ Replace or reinstall the brush slip ring assembly.
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A12 : DB RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C121)

Check, recheck and clean the drum according to the procedures below.

(1) Check in C120 : PB CH CONDITION with alignment tape. When the result is OK, perform (2) and later.
(2) Adjust the recording current in A122 : REC CURRENT.
Recheck in the menu C121 : REC CH CONDITION after recording any video signal again for two minutes or more.
When no abnormality is found, the check is completed.

Note

The recorded data on the tape will be overwritten in checking in the menu C121 : REC CH CONDITION. Before the recheck, record any video signal again on the tape for two minute or more.

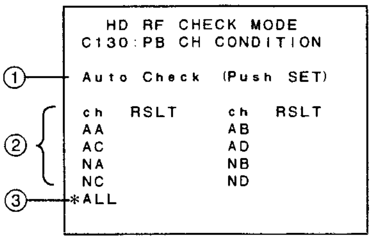
(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C121 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds).
Recheck in the menu C121 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C121 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system
  A00 : SERVO ADJUST
  ⇨ Check the servo system
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C130 : PB CH CONDITION

This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when a tape recorded in HDCAM format is played back by tracking.



```
   HD  RF  CHECK  MODE
 C130:PB  CH  CONDITION

 Auto  Check  (Push  SET)

 ch   RSLT      ch   RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, the menus of C1 : RF do not function properly.

Description of superimposed display

① The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) :	Requesting to press the F5 (SET) button to initiate the check.
Auto Checking... :	Check is in progress.
Auto Check Complete :	Check is completed.
Auto Check Failure :	Check failure
Condition NG :	Error condition defect
Insert HR5-1A :	Requesting to insert an alignment tape HR5-1A.

② To check the condition for single channel, select a channel name using an * mark.

After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.

Even if the check fails, "RED" will be displayed.

Notes

- "RSLT" indicates the result.
- AA, AB, AC and AD indicate Advance head A, B, C and D repectively.
- NA, NB, NC and ND indicate Confidence head A, B, C and D respectively.

③ To check the conditions for all channels at a time, select "ALL" using the * mark.

During the check, the condition in each channel is displayed in area ②.

After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

To execute the C130 : PB CH CONDITION check (for HDCAM)

(1) Insert a cassette tape recorded in HDCAM format. The alignment tape HR5-1A is recommended.

Note

To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion more than a check execution time.
The check execution time is usually about ten seconds in each channel check and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the PLAY mode.
- During the check, the message "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than PLAY mode.
  If the unit enters into other mode than PLAY mode, the check freezes or the condition becomes "RED".

(4) Check to see the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C130)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C130)" on next page.

Notes

- If the check results for all channels are "RED" when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C130)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

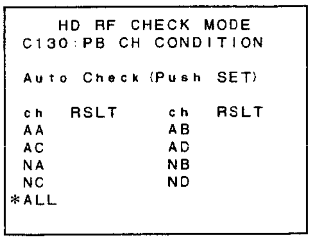
Note

To change the cassette tape before starting the check, press the F5 (SET) button while pressing the EJECT button.
The tape is then ejected without influencing the check result. Insert another cassette tape and press the PLAY button. The check is then initiated. This operation does not coincide with the message on the superimposed display.

Example of display and operation

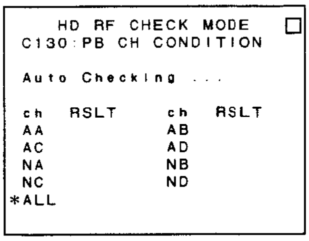
When ALL is selected in C130 : PB CH CONDITION.

Superimposed display



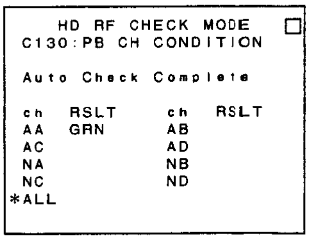
```
    HD RF CHECK MODE
C130:PB CH CONDITION

Auto Check (Push SET)

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

(1) ⇩ Insert HR5-1A
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5(SET)



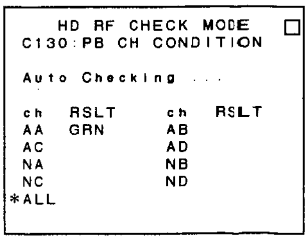
```
    HD RF CHECK MODE    ☐
C130:PB CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



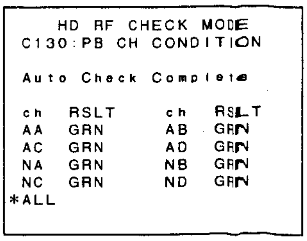
```
    HD RF CHECK MODE    ☐
C130:PB CH CONDITION

Auto Check Complete

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



```
    HD RF CHECK MODE    ☐
C130:PB CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩
(omitted)
⇩



```
    HD RF CHECK MODE
C130:PB CH CONDITION

Auto Check Complete

ch   RSLT      ch   RSLT
AA   GRN       AB   GRN
AC   GRN       AD   GRN
NA   GRN       NB   GRN
NC   GRN       ND   GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)

For Check Failure (C130)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure will occur on the tape recorded in the failed HDCAM VTR. Confirm that the tape can be correctly played back in the other normal operating HDCAM VTR.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C130)".
   - Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush/slip ring assembly defect or its part installation/ connection defect
     ⇨ Replace or reinstall the brush/slip ring assembly
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A13: HD RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C130)

Recheck according to the procedures below.

(1) If a check is performed without using alignment tape HR5-1A, recheck in the menu C130 using the alignment tape HR5-1A.
When no abnormality is found, the check is completed.

Note

When no abnormality is found during the check using the alignment tape, a trouble (tape is damaged or recording is not done properly) is considered to exist on the tape portion used in the previous check.

(2) Change the playback portion on the alignment tape. Recheck in the menu C130. When no abnormality is found, the check is completed.

(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C130 using the alignment tape. When no abnormality is found, the check is completed.

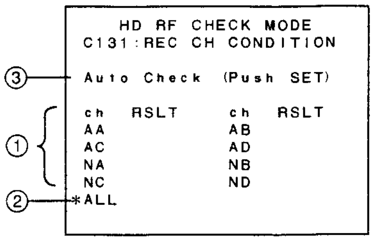
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds)
Recheck in the menu C130 using the alignment tape. When no abnormality is found, the check is completed.

(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C130 using the alignment tape. When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system.
  A00 : SERVO ADJUST
  ⇨ Check the servo system.
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- RF system adjustment defect
  ⇨ Readjust the RF system. (A13 : HD RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport system, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

C131 : REC CH CONDITION



```
       HD RF CHECK MODE
     C131 :REC CH CONDITION
   Auto Check  (Push SET)
   ch   RSLT      ch   RSLT
   AA             AB
   AC             AD
   NA             NB
   NC             ND
  *ALL
```

This menu is displayed for the recorder of HDW series.
This menu checks and displays the error condition for each channel in three steps (GRN, YEL, and RED) when recording on the tape recorded in HDCAM format in the insert REC mode and when recording in crash REC mode.
In the insert REC mode, checks using each PB signal from the advance PB heads (AA, AB, AC, and AD) by tracking.
In the crash REC mode, checks using each PB signal from the confidence PB heads (NA, NB, NC and ND).

Notes

- A cassette tape recorded in other format is automatically ejected.
- The condition for each channel cannot be checked using a CH CONDITION indicator.
- If abnormality exists in the servo system, this menu does not function properly.

Description of superimposed display

① To check the condition for single channel, select a channel name using an * mark.
After the check of the channel is completed, the condition (GRN, YEL, or RED) will be displayed on the right of the channel name.
Even if the check fails, "RED" will be displayed.

Note

"RSLT" indicates the result.

② To check the conditions for all channels, select "ALL" using the * mark.
During the check, the condition in each channel is displayed in area ①.
After the check for all channels is completed, "GRN" is also displayed on the right of "ALL" when the conditions for all channels are GRN. If there is at least one channel whose condition is YEL or RED, the worst condition is displayed on the right of "ALL".

③ The display in this line changes. Each display and its meaning are described below.

Auto Check (Push SET) :	Requesting to press the F5 (SET) button to initiate the check.
Waiting... :	Tracking is in an optimization process.
Auto Checking... :	Check is in progress.
Auto Check Complete :	Check is completed.
Auto Check Failure :	Check failure
Condition NG :	Error condition defect

To execute C131 : REC CH CONDITION check

(1) Insert a record-able cassette tape recorded in HDCAM format.

Notes

- The recorded data on the inserted cassette tape will be rewritten to another data in this check.
- To complete the check, the inserted cassette tape requires the continuous playback-able recorded portion than two minutes. Before check, record any video signal on the tape for two minutes or more.
- The check execution time for each channel is usually about ten seconds and about 80 seconds in an ALL check.

(2) Turn the MULTI CONTROL knob to set the * mark to a channel to be checked or "ALL". Usually, select "ALL".

(3) Press the F5 (SET) button to initiate the automatic check.

- The check is initiated after automatically running the tape in the REC mode.
- During the check, the message "Waiting ..." or "Auto Checking ..." will be displayed.
  During ALL check execution, the check result in the channel will be displayed every time a one-channel check is completed.
- To cancel the check, press the F6 (EXIT) button once.

Notes

- If the message "Auto Check (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be check. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic check is completed. Check cannot be properly performed in other mode than REC mode. If the unit enters into other mode than REC mode, the check freezes or the condition becomes "RED".

(4) Check the result of checking.

- When no abnormality is found, "GRN" will be displayed on the right of the selected channel or "ALL".
- If the message "Auto Check Failure" is displayed, refer to the "For Check Failure (C131)" on next page.
- If the message "Condition NG" is displayed or if the conditions other than "GRN" are displayed on the right of the checked channel, refer to the "For Condition NG (C131)" on next page.

Notes

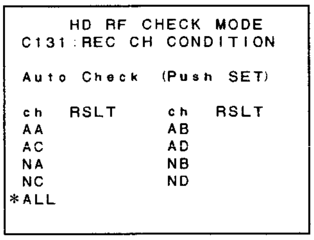
- If the check results for all channels are RED when displaying the message "Condition NG" in ALL check, refer to the "For Check Failure (C131)".
- "GRN", "YEL", or "RED" is also displayed in the menu display area. In only the menu display area, it cannot be discerned whether the condition is NG or check failure when displaying "RED".
  The check result for each channel is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL check.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the check again in this menu, go to step (2).

Example of display and operation

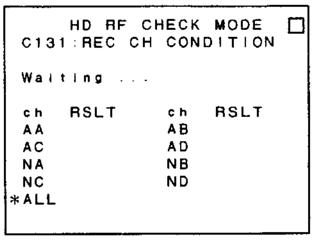
When ALL is selected in C131 : REC CH CONDITION.

Superimposed display



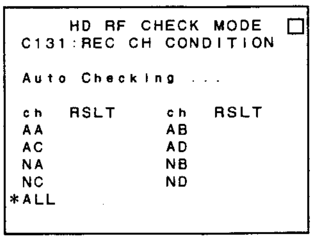
```
      HD RF CHECK MODE
C131:REC CH CONDITION

Auto Check  (Push SET)

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

(1) ⇩ Insert a recorded tape
(2) ⇩ Select : MULTI CONTROL
(3) ⇩ F5 (SET)



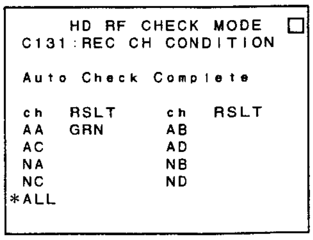
```
      HD RF CHECK MODE  □
C131:REC CH CONDITION

Waiting ...

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



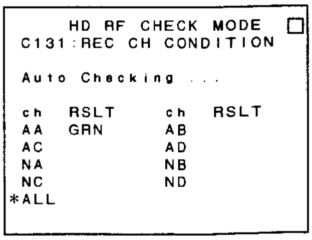
```
      HD RF CHECK MODE  □
C131:REC CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA             AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



```
      HD RF CHECK MODE  □
C131:REC CH CONDITION

Auto Check Complete

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

⇩



```
      HD RF CHECK MODE  □
C131:REC CH CONDITION

Auto Checking ...

ch   RSLT      ch   RSLT
AA   GRN       AB
AC             AD
NA             NB
NC             ND
*ALL
```

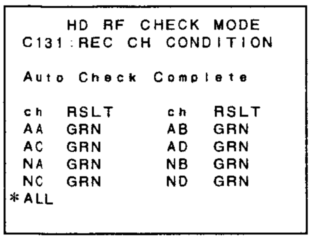
⇩

(omitted)

⇩

(continue to next page)

(continued)
⇩



```
   HD  RF  CHECK  MODE
C131 : REC  CH  CONDITION

Auto  Check  Complete

ch   RSLT      ch   RSLT
AA   GRN       AB   GRN
AC   GRN       AD   GRN
NA   GRN       NB   GRN
NC   GRN       ND   GRN
*ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)

For Check Failure (C131)

Recheck after changing the portion on the tape.
If no check failure occurs again, a trouble is considered to exist on the tape portion used in the previous check.

1. Cassette tape check
   Check failure occurs if using the tape recorded in otherwise than HDCAM format or the non-recorded tape.
   Moreover, check failure will also occur on the tape recorded in the failed HDCAM VTR. Execute recording by the unit to be tested and confirm that the unit can correctly play back the tape.

2. If no trouble is found on the used tape
   The possible cause below are considered.

   - Heads clogging
     ⇨ Perform steps (1) to (5) of "For Condition NG (C131)".
     Servo system adjustment defect or circuit defect
     ⇨ Readjust the servo system
     A00 : SERVO ADJUST
     ⇨ Check the servo system
     C010 : S REEL
     C011 : T REEL
     C014 : CAPSTAN
     C015 : DRUM
   - Brush slip ring assembly defect or its part installation/connection defect
     ⇨ Replace or reinstall the brush slip ring assembly.
   - Harness (between EQ-84 board and drum assembly) connection defect
   - PB RF system adjustment defect
     ⇨ Readjust the RF system (A13 :HD RF ADJUST)
   - EQ-84 board defect
   - Drum assembly defect

For Condition NG (C131)

Check, recheck and clean the drum according to the procedures below.

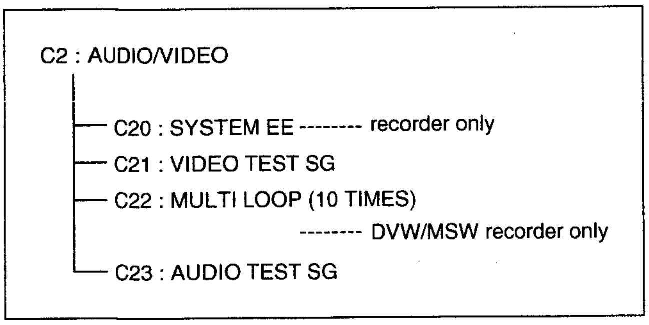
(1) Check in C130 : PB CH CONDITION with alignment tape. When the result is OK, perform (2) and later.
(2) Adjust the recording current in A132 : REC CURRENT.
Recheck in the menu C131 : REC CH CONDITION after recording any video signal again for two minutes or more.
When no abnormality is found, the check is completed.
Note
The recorded data on the tape will be overwritten in checking in the menu C131 : REC CH CONDITION.
Before the recheck, record any video signal again on the tape for two minute or more.
(3) Clean the drum using a cleaning tape according to Section 4-2-1.
Recheck in the menu C131 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(4) Clean the drum using the cleaning tape again (the amount of the tape used is 15 seconds).
Recheck in the menu C131 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.
(5) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C131 after re-recording any video signal on the tape for two minutes or more.
When no abnormality is found, the check is completed.

If the error condition is not improved in the way mentioned above, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system
  A00 : SERVO ADJUST
  ⇨ Check the servo system
  C010 : S REEL
  C011 : T REEL
  C014 : CAPSTAN
  C015 : DRUM
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or the drum assembly as required.
- In the tape transport, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

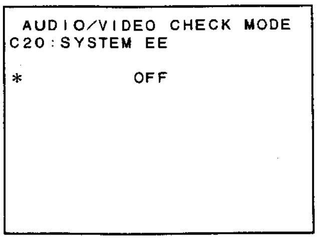
3-2-4. AUDIO/VIDEO Check Mode (C2)

The C2 : AUDIO/VIDEO mode has four menus that are useful for checking audio and video systems.
Two menus are available to a recorder only.


C2 : AUDIO/VIDEO
C20 : SYSTEM EE -------- recorder only
C21 : VIDEO TEST SG
C22 : MULTI LOOP (10 TIMES)
-------- DVW/MSW recorder only
C23 : AUDIO TEST SG

Menu Tree of AUDIO/VIDEO Check Mode

C20 : SYSTEM EE



```
AUDIO/VIDEO CHECK MODE
C20:SYSTEM EE
*          OFF
```

This menu is displayed for a recorder only.
This menu selects the system EE function to be enabled or disable in the maintenance mode, and additionally selects a signal path when the system EE function is enabled.

HDW recorder

OFF : Normal state (in which the system E-E state is not entered)
FIL-EE : The signal processed at IC115 (IN-FIL) on the HPR-1 board is passed to playback side.
BRR-EE : The signal processed at IC200, 204 (HENC) on the HPR-1 board is passed to playback side.
ECC-EE : The signal processed at IC305 (ECC-ENCORDER) on the HPR-1 board is passed to playback side.
RF-EE : The RF signal is passed to playback side from recording side on the EQ-84 board.

DVW recorder

OFF : Normal state (in which the system E-E state is not entered)
RF-EE : The RF signal is passed to playback side from recording side on the EQ-84 board.

MSW recorder

OFF : Normal state (in which the system E-E state is not entered)
MFC-EE : The signal processed at IC407 (MFC) on the DPR-155/229 board is passed to playback side.
ECC-EE : The signal processed at IC500 (ECC ENCODER) on the EPR-1 board is passed to playback side.
RF-EE : The RF signal is passed to playback side from recording side on the EQ-84 board.

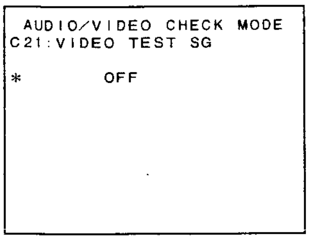
System EE setting

To set the system EE function, turn the MULTI CONTROL knob and display the desired setting.
The specified setting is maintained until the maintenance mode is terminated or the setting is changed. This menu is set to OFF when the maintenance mode is activated.

Note

Be sure to perform under the no cassette tape state when selecting the system EE to enable.

C21 : VIDEO TEST SG



```
 AUDIO/VIDEO CHECK MODE
C21:VIDEO TEST SG

*         OFF
```

This menu selects the operation in the maintenance mode of a video test signal generator incorporated in this unit.

OFF :	The video test signal generator operation stops.
Other than OFF :	The video test signal generator outputs the selected signals listed below. (Refer to Section 1-23 also.)

HDW series

HD Color Bars/HD Multi Burst/HD 10 Steps/
HD Pulse and Bar/HD Ramp/HD Black/
HD Pathological Check 1/HD Pathological Check 2/
SD 100 % Color Bars/SD 75 % Color Bars [*3]/
SD 75 % Reverse CB/SD Bowtie/SD Pulse and Bar [*3]/
SD Multi Burst/SD H Sweep/SD 5 step/SD Ramp [*3]/
SD Shallow Ramp/SD Red Signal/SD 50 % Flat/
SD 100 % Flat [*3]/SD Black Burst/SD Pathological Check/
SD NTC7 (NTSC) [*1] [*3]/SD Line330 (625) [*2] [*3]

*1 : 59.94 Hz mode only
*2 : 50 Hz mode only
*3 : Not displayed normally in the 24 Hz mode.

DVW series and MSW series

100 % color bars/75 % color bars/75 % reverse color bars/
Bowtie/Pulse and bar/Multi-burst/H sweep/5-step/Ramp/
Shallow ramp/Red signal/50 % flat/100 % flat/Black burst/
SDI check field/NTC7 (NTSC) [*1]/Line330 (625) [*2]

*1 : 525 mode only
*2 : 625 mode only

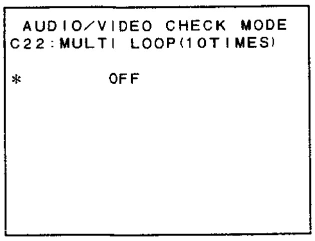
Setting of video test signal generator

To set the video test signal generator, turn the MULTI CONTROL knob while pressing the HOME button and display the desired setting.
This setting is valid until the maintenance mode is terminated. However, changing the setting of C22 : MULTI LOOP (10 TIMES) resets C21 : VIDEO TEST SG to OFF.
This menu is OFF when the maintenance mode is activated.

Note

The output signal of the test signal generator can also be recorded on the tape when using a recorder. In this case, press the F5 (SET) button to display the white square at the upper right of the super imposed display, and then perform recording.

C22 : MULTI LOOP (10 TIMES)



```
 AUDIO/VIDEO CHECK MODE
C22:MULTI LOOP(10TIMES)

*        OFF
```

This menu is displayed for DVW series and MSW series recorders only.
This menu selects the multi-loop function enabled or disabled in the maintenance mode, and additionally selects a video test signal when the multi-loop function is enabled. The video test signal that can be selected is output from the internal video test signal generator. The video test signal is the same in type as one described in C21 : VIDEO TEST SG menu.

OFF :	Normal state (in which no multi-loop operation is performed)
Other than OFF :	Multi-loop operation is performed using the video signal output from the internal video signal generator.

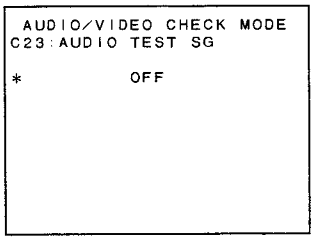
Multi-loop function setting

To set the multi-loop function, turn the MULTI CONTROL knob while pressing the HOME button and display a desired setting.
This setting is valid until the maintenance mode is terminated. However, C22 : MULTI LOOP (10 TIMES) setting is reset to OFF when C21 : VIDEO TEST SG setting is changed.
This menu is OFF when the maintenance mode is activated.

Note

The output signal during multi-loop operation can also be recorded on the tape. In this case, press the F5 (SET) button to display the white square at the upper right of the superimposed display, then perform recording.

C23 : AUDIO TEST SG



```
 AUDIO/VIDEO CHECK MODE
C23:AUDIO TEST SG

*        OFF
```

This menu selects the operation in the maintenance mode of the audio test signal generator incorporated in this unit.

OFF :	The audio test signal generator operation stops.
Other than OFF :	The audio test signal generator outputs the selected signals listed below. Silence 1 kHz sine 0 VU 1 kHz sine burst/1 field 1 kHz sine burst/5 field Saw wave MULTI : Generates the signals below.

CH1 :	200 Hz
CH2 :	400 Hz
CH3 :	800 Hz
CH4 :	1 kHz
CH5 :	2 kHz *1
CH6 :	4 kHz *1
CH7 :	6 kHz *1
CH8 :	12 kHz *1

*1 : MSW series only

Note

Frequency decreases 4 % in the 24 Hz mode of the HDW series.

Setting of audio test signal generator

To set the audio test signal generator, turn the MULTI CONTROL knob while pressing the HOME button and display a desired setting.
This setting is valid until the maintenance mode is terminated. This menu is set to OFF when the maintenance mode is activated.

Note

The output signal of the test signal generator can also be recorded on the tape when using a recorder. In this case, press the F5 (SET) button to display the white square at the upper right of the superimposed display, then perform recording.

3-2-5. BETACAM PB Check Mode (C3)

The C3 : BETACAM PB mode is used to check the playback RF system based on a Betacam/Betacam SP format.
This mode is displayed for the unit that can play back the analog Betacam.

```
C3 : BETACAM PB
 |
 └── C30 : CHANNEL CONDITION
```

Menu Tree of BETACAM PB Check Mode

Note

NTSC model's Betacam/Betacam SP PB function is for the NTSC (525/60) system. But simple playback of the PAL (625/50) system is possible for HDW series and MSW series. It is impossible for DVW series.
PAL model's Betacam/Betacam SP PB function is for the PAL (625/50) system. But simple playback of the NTSC (525/60) system is possible for HDW. It is impossible for DVW series.

C30 : CHANNEL CONDITION

This menu displays the PB RF level condition of video channels (YA, YB, CA and CB) in two steps (GRN and RED) when the tape recorded in a Betacam/Betacam SP format is played back in the PLAY mode.

Note

If abnormality exists in the servo system, C30 : CHANNEL CONDITION menu does not function properly.

To execute the check

- To stop the check, press the F6 (EXIT) button two times.

(1) Insert a cassette tape recorded in Betacam/Betacam SP format.
(2) Press the PLAY button to playback the tape in the PLAY mode.
- ">>>" will be displayed on the superimposed display.

Note

Can not be checked in other than PLAY mode.
">>>" is not displayed in playing back the portion recorded in otherwise than Betacam/Betacam SP format or the non-recorded portion.

(3) Check to see that ">>>" is displayed in the "GRN" column of all channels.
- If "RED" is displayed in columns refer to "For Condition NG (C30) " on the next page.

(4) Stop the tape playback operation to finish the check.
(5) Press the F5 (SET) button.
- A white square will be displayed in the upper-right position of the superimposed display.

(6) Stop the tape playback operation and eject the cassette.
(7) Press the F6 (EXIT) button once. The white square disappears.
(8) To exit the menu, press the F6 (EXIT) button once again.

Example of display and operation

```
 BETACAM PB CHECK MODE
C30:CHANNEL CONDITION

                ¦Grn¦Red
 ENV Y-Ach
 ENV Y-Bch
 ENV C-Ach
 ENV C-Bch
```

(1) ⇩ Insert a recorded tape
(2) ⇩ PLAY

```
 BETACAM PB CHECK MODE □
C30:CHANNEL CONDITION

                ¦Grn¦Red
 ENV Y-Ach       >>>
 ENV Y-Bch       >>>
 ENV C-Ach       >>>
 ENV C-Bch       >>>
```

(3) ⇩ Check
(4) ⇩ STOP
(5) ⇩ F5 (SET)

```
 BETACAM PB CHECK MODE □
C30:CHANNEL CONDITION

                ¦Grn¦Red
 ENV Y-Ach
 ENV Y-Bch
 ENV C-Ach
 ENV C-Bch
```

(6) ⇩ EJECT
(7) ⇩ F6 (EXIT)
(8) ⇩ F6 (EXIT)

For Condition NG (C30)

Recheck and clean the drum according to the procedures below.

(1) Change the playback portion on the tape.
Recheck in the menu C30.
When no abnormality is found, the check is completed.
(2) Clean the drum for five seconds using a cleaning tape according to Section 4-2-1.
Recheck in the menu C30.
When no abnormality is found, the check is completed.
(3) Clean the drum for fifteen seconds using the cleaning tape again.
Recheck in the menu C30.
When no abnormality is found, the check is completed.
(4) Clean the drum (video heads) with a cleaning cloth according to Sections 4-2-2 and 4-2-3.
Recheck in the menu C30.
When no abnormality is found, the check is completed.

If the condition is not improved in the way mentioned above, the possible cause below are considered.

Abnormality on PB tape

- The tape is damaged.
- The tape cannot be recorded properly.

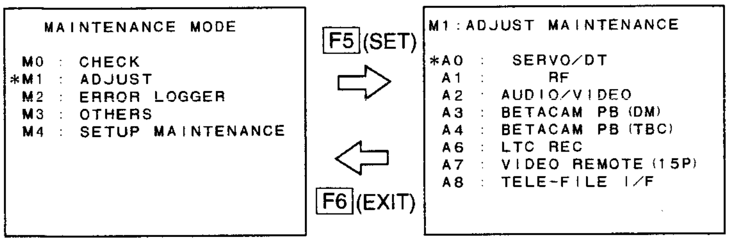
Abnormality in this unit

- Analog Betacam PB system adjustment defect
  ⇨ Readjust the analog Betacam PB system (A3 : BETACAM PB (DM))
  Perform the same adjustments at the replacement of the DM-123 board.
- In the tape transport system, adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- Worn PB head
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly as required.
- Drum assembly defect
- EQ-84 board defect

3-3. ADJUST MAINTENANCE Mode (M1)

3-3-1. Overviews

The M1 : ADJUST MAINTENANCE mode is used to adjust this unit.



```
MAINTENANCE MODE

 M0 : CHECK
*M1 : ADJUST
 M2 : ERROR LOGGER
 M3 : OTHERS
 M4 : SETUP MAINTENANCE
```

```
M1 : ADJUST MAINTENANCE

*A0 :   SERVO/DT
 A1 :      RF
 A2 : AUDIO/VIDEO
 A3 : BETACAM PB (DM)
 A4 : BETACAM PB (TBC)
 A6 : LTC REC
 A7 : VIDEO REMOTE (15P)
 A8 : TELE-FILE I/F
```

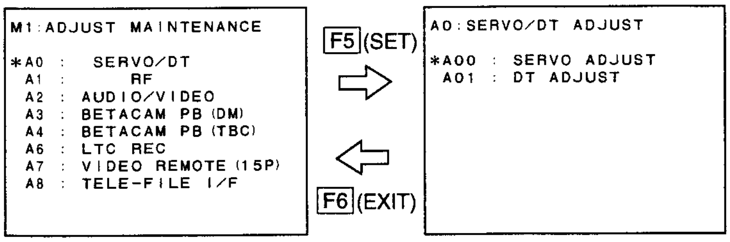
MAINTENANCE Mode **ADJUST MAINTENANCE Mode**

Notes

- A6 : LTC REC will not be displayed for the recorder.
- A3 : BETACAM PB (DM), A4 : BETACAM PB (TBC), and A6 : LTC REC will not be displayed in the HDW-2000/D2000, DVW-2000/P and MSW-2000.

A0 : SERVO/DT

This mode is used to adjust the servo and DT systems.
For more details, refer to Section 3-3-2.



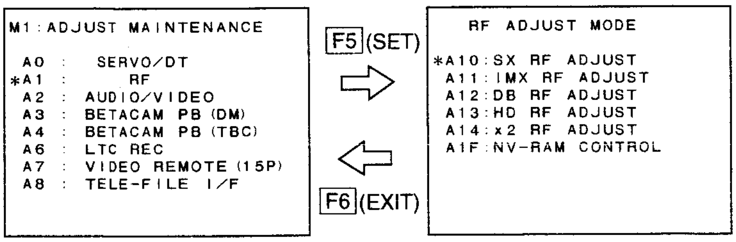
```
M1:ADJUST MAINTENANCE

*A0 :   SERVO/DT
 A1 :      RF
 A2 : AUDIO/VIDEO
 A3 : BETACAM PB (DM)
 A4 : BETACAM PB (TBC)
 A6 : LTC REC
 A7 : VIDEO REMOTE (15P)
 A8 : TELE-FILE I/F
```

```
A0:SERVO/DT ADJUST

*A00 : SERVO ADJUST
 A01 : DT ADJUST
```

Title		Page	Description
A00 : SERVO ADJUST		—	Adjustment mode for servo system
	A000 : A001-A00A ADJUST	3-63	Continuously executes the adjustments A001 to A00A.
	A001 : S REEL FG DUTY	3-64	Adjusts the duty ratio of the S reel FG.
	A002 : T REEL FG DUTY	3-64	Adjusts the duty ratio of the T reel FG.
	A003 : CAPSTAN FG DUTY	3-64	Adjusts the duty ratio of the capstan FG.
	A004 : S REEL OFFSET/FRIC	3-64	Adjusts the S reel offset and friction.
	A005 : T REEL OFFSET/FRIC	3-64	Adjusts the T reel offset and friction.
	A006 : S REEL TORQUE	3-64	Adjusts the S reel torque.
	A007 : T REEL TORQUE	3-64	Adjusts the T reel torque.
	A008 : CAPSTAN QPL GAIN	3-64	Adjusts the capstan QPL gain.
	A009 : T REEL QPL GAIN	3-64	Adjusts T reel QPL gain.
	A00A : S/T TENSION OFFSET	3-64	Adjusts the tension regulator offset values on the S and T sides.
	A00B : RF SWITCHING POS.	3-65	Adjusts the RF switching position.
	A00F : NV-RAM CONTROL	3-67	Save the servo system adjustment data.
A01 : DT ADJUST		—	Adjustment mode for DT system
	A010 : ANALOG DT ADJUST	3-68	(Displayed for the unit that can play back the analog Betacam.) Adjusts the analog Betacam DT system.
	A011 : DIGITAL DT ADJUST	3-70	Adjusts the digital DT system.
	A01F : NV-RAM CONTROL	3-72	Save the DT system adjustment data.

A1 : RF ADJUST

This mode is used to adjust the RF system.
For more details, refer to Section 3-3-3.


M1 : ADJUST MAINTENANCE
A0 : SERVO/DT
*A1 : RF
A2 : AUDIO/VIDEO
A3 : BETACAM PB (DM)
A4 : BETACAM PB (TBC)
A6 : LTC REC
A7 : VIDEO REMOTE (15P)
A8 : TELE-FILE I/F
F5 (SET)
F6 (EXIT)
RF ADJUST MODE
*A10 : SX RF ADJUST
A11 : IMX RF ADJUST
A12 : DB RF ADJUST
A13 : HD RF ADJUST
A14 : x2 RF ADJUST
A1F : NV-RAM CONTROL

Notes

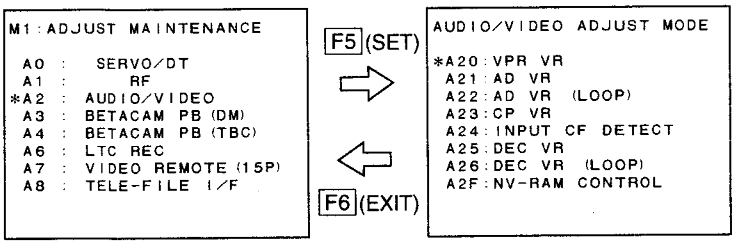
- A12 : DB RF ADJUST is not displayed in the MSW-2000/A2000/A2000P.
- A13 : HD RF ADJUST is not displayed in the DVW/MSW series.
- A10 : SX RF ADJUST, A11 : IMX RF ADJUST, and A12 : DB RF ADJUST are not displayed in the HDW-2000.
- A10 : SX RF ADJUST is not displayed in the HDW-D2000.
- A11 : IMX RF ADJUST and A12 : DB RF ADJUST are not displayed in the HDW-S2000.
- For the HDW series, A10 : SX RF ADJUST, A11: IMX RF ADJUST, and A12 : DB RF ADJUST are not displayed in the 24 Hz mode.

Title	Page	Description
A10 : SX RF ADJUST	—	(Displayed for the unit that can play back the Betacam SX.) Adjustment mode for RF system of Betacam SX format
A101 : EQUALIZER	3-74	Adjusts the PB head playback level and PB equalizer.
A103 : PLAY PLL	3-74	Adjusts the PB PLL circuit in the PLAY mode.
A104 : FWD PLL	3-74	Adjusts the PB PLL circuit in the FORWARD mode.
A105 : REV PLL	3-74	Adjusts the PB PLL circuit in the REVERSE mode.
A106 : A/D GAIN	3-74	Adjusts the gain when a PB RF signal is converted from analog to digital.
A107 : A101-A106 ALL ADJUST	3-78	Continuously executes the above automatic adjustment menus A101 to A106.
A11 : IMX RF ADJUST	—	(Displayed for the unit that can play back the MPEG IMX.) Adjustment mode for RF system of MPEG IMX format
A111 : EQUALIZER	3-80	Adjusts the PB head playback level and PB equalizer.
A112 : REC CURRENT	3-80	Adjusts the recording current and recording frequency characteristic. (Exclusive for MSW recorder)
A113 : PLAY PLL	3-80	Adjusts the PB PLL circuit in the PLAY mode.
A114 : FWD PLL	3-80	Adjusts the PB PLL circuit in the FORWARD mode.
A115 : REV PLL	3-80	Adjusts the PB PLL circuit in the REVERSE mode.
A116 : A/D GAIN	3-80	Adjusts the gain when a PB RF signal is converted from analog to digital.
A117 : A111-A116 ALL ADJUST	3-84	Continuously executes the above automatic adjustment menus A111 to A116.

Title	Page	Description
A12 : DB RF ADJUST	—	(Displayed for the unit that can play back the Digital Betacam.) Adjustment mode for RF system of Digital Betacam format
A121 : EQUALIZER	3-86	Adjusts the PB head playback level and PB equalizer.
A122 : REC CURRENT	3-86	Adjusts the recording current and recording frequency characteristic. (Exclusive for DVW recorder)
A123 : PLAY PLL	3-86	Adjusts the PB PLL circuit in the PLAY mode.
A124 : FWD PLL	3-86	Adjusts the PB PLL circuit in the FORWARD mode.
A125 : REV PLL	3-86	Adjusts the PB PLL circuit in the REVERSE mode.
A126 : A/D GAIN	3-86	Adjusts the gain when a PB RF signal is converted from analog to digital.
A127 : A121-A126 ALL ADJUST	3-90	Continuously executes the above automatic adjustment menus A121 to A126.
A13 : HD RF ADJUST	—	(Displayed for the unit that can play back the HDCAM.) Adjustment mode for RF system of HDCAM format
A131 : EQUALIZER	3-92	Adjusts the PB head playback level and PB equalizer.
A132 : REC CURRENT	3-92	Adjusts the recording current and recording frequency characteristic. (Exclusive for HDW recorder)
A133 : PLAY PLL	3-92	Adjusts the PB PLL circuit in the PLAY mode.
A134 : FWD PLL	3-92	Adjusts the PB PLL circuit in the FORWARD mode.
A135 : REV PLL	3-92	Adjusts the PB PLL circuit in the REVERSE mode.
A136 : A/D GAIN	3-92	Adjusts the gain when a PB RF signal is converted from analog to digital.
A137 : A131-A136 ALL ADJUST	3-96	Continuously executes the above automatic adjustment menus A131 to A136.
A14 : x2 RF ADJUST	—	(Displayed for only models having MPEG IMX-format ×2 playback function.) Adjustment mode for RF system of MPEG IMX format ×2 playback.
A141 : EQUALIZER	3-98	Adjusts the PB head playback level and PB equalizer.
A143 : PLAY PLL	3-98	Adjusts the PB PLL circuit in the PLAY mode.
A146 : A/D GAIN	3-98	Adjusts the gain when a PB RF signal is converted from analog to digital.
A147 : A141-A146 ALL ADJUST	3-102	Continuously executes the above automatic adjustment menus A141 to A146.
A1F : NV-RAM CONTROL	3-104	Saves the RF adjustment data.

A2 : AUDIO/VIDEO

This mode is used to adjust the audio and video systems.
For more details, refer to Section 3-3-4.



```
M1 : ADJUST MAINTENANCE

 A0  :   SERVO/DT
 A1  :      RF
*A2  :  AUDIO/VIDEO
 A3  :  BETACAM PB (DM)
 A4  :  BETACAM PB (TBC)
 A6  :  LTC REC
 A7  :  VIDEO REMOTE (15P)
 A8  :  TELE-FILE I/F
```

```
AUDIO/VIDEO ADJUST MODE

*A20 : VPR VR
 A21 : AD VR
 A22 : AD VR  (LOOP)
 A23 : CP VR
 A24 : INPUT CF DETECT
 A25 : DEC VR
 A26 : DEC VR  (LOOP)
 A2F : NV-RAM CONTROL
```

Title		Page	Description
A20 : VPR VR	*1	3-106	Adjusts the reference signal system and analog video output system on the VPR board.
A21 : AD VR	*1	3-106	Adjusts the analog component video input system.
A22 : AD VR (LOOP)	*1	3-107	Adjusts the analog component video input system in the multi-loop state.
A23 : CP VR		3-107	Adjustment mode for the SDI and SDTI input/output interfaces.
A231 : SDI ENC1 VCO	*1	3-107	Adjusts the SDI output interface.
A232 : SDI ENC2 VCO	*1	3-107	Adjusts the SDI output interface.
A233 : SDI DEC VCO	*1	3-107	Adjusts the SDI input interface.
A234 : SDTI ENC VCO	*1	3-107	Adjusts the SDTI output interface.
A235 : SDTI DEC VCO	*1	3-107	Adjusts the SDTI input interface.
A24 : INPUT CF DETECT	*1	3-110	Adjusts the color frame detection timing of a composite video input.
A25 : DEC VR	*1	3-111	Adjusts the composite video input system.
A26 : DEC VR (LOOP)	*1	3-111	Adjusts the composite video input in the multi-loop state.
A2F : NV-RAM CONTROL		3-112	Saves the adjustment data of audio and video systems.

*1 : Applicable to models listed below

Title	HDW-		DVW-	MSW-	
	2000 D2000 M2000/P S2000/P	M2100/P	2000/P M2000/P	2000 A2000/P M2000/P M2000E/P	M2100/P M2100E/P
A20 : VPR VR	○*3	○*3	○	○	○
A21 : AD VR	–	–	–	○	–
A22 : AD VR (LOOP)	–	–	–	○	–
A231 : SDI ENC1 VCO	○*3	○*3	○	○	○
A232 : SDI ENC2 VCO	○*3	○*3	○	○	○
A233 : SDI DEC VCO	–	–	○	○	–
A234 : SDTI ENC VCO	○*2	○*2	–	○	○
A235 : SDTI DEC VCO	○*2	–	–	○	–
A24 : INPUT CF DETECT	–	–	○	○	–
A25 : DEC VR	–	–	○	○	–
A26 : DEC VR (LOOP)	–	–	○	○	–

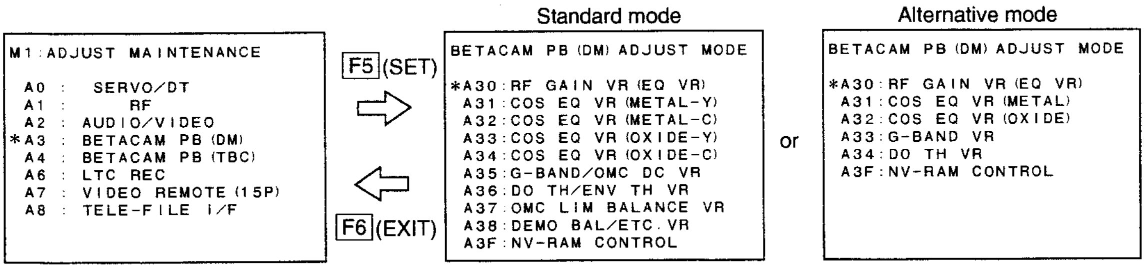
*2 : Option HKDW-102 is installed.
*3 : Not displayed in the 24 Hz mode.

A3 : BETACAM PB (DM)

This mode is used to adjust the PB system based on a Betacam/Betacam SP format.
For more details, refer to Section 3-3-5.
Two types of menu structure are available : for the standard mode and for the alternative mode.

Original : The NTSC (525/60) model plays back as an NTSC model, or the PAL (625/50) model plays back as an PAL mode.

Alternate : The NTSC (525/60) model plays back as a PAL model, or the PAL (625/50) model plays back as an NTSC model.



```
M1 : ADJUST MAINTENANCE

 A0 :   SERVO/DT
 A1 :     RF
 A2 :  AUDIO/VIDEO
*A3 :  BETACAM PB (DM)
 A4 :  BETACAM PB (TBC)
 A6 :  LTC REC
 A7 :  VIDEO REMOTE (15P)
 A8 :  TELE-FILE I/F
```

```
BETACAM PB (DM) ADJUST MODE

*A30:RF GAIN VR (EQ VR)
 A31:COS EQ VR (METAL-Y)
 A32:COS EQ VR (METAL-C)
 A33:COS EQ VR (OXIDE-Y)
 A34:COS EQ VR (OXIDE-C)
 A35:G-BAND/OMC DC VR
 A36:DO TH/ENV TH VR
 A37:OMC LIM BALANCE VR
 A38:DEMO BAL/ETC.VR
 A3F:NV-RAM CONTROL
```

```
BETACAM PB (DM) ADJUST MODE

*A30:RF GAIN VR (EQ VR)
 A31:COS EQ VR (METAL)
 A32:COS EQ VR (OXIDE)
 A33:G-BAND VR
 A34:DO TH VR
 A3F:NV-RAM CONTROL
```

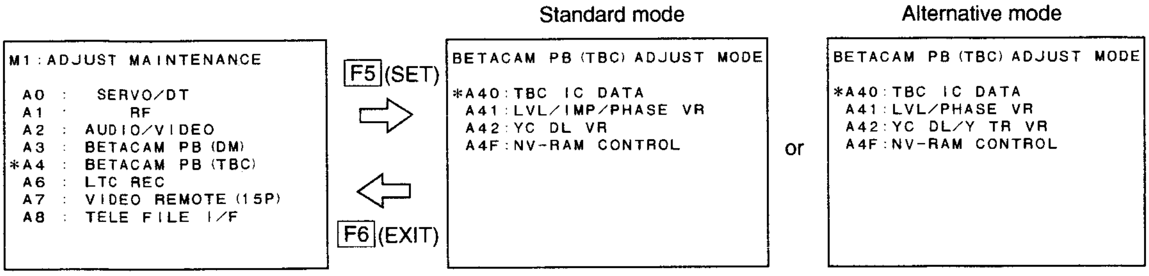
Title (Standard mode)	Page	Description
A30 : RF GAIN VR (EQ VR)	3-113	Adjusts the gain of an analog Betacam PB RF amplifier (EQ-84).
A31 : COS EQ VR (METAL-Y)	3-114	Adjusts the Y signal equalizer (EQ-84) for the metal tape playback.
A32 : COS EQ VR (METAL-C)	3-114	Adjusts the chroma signal equalizer (EQ-84) for the oxide tape playback.
A33 : COS EQ VR (OXIDE-Y)	3-114	Adjusts the Y signal equalizer (EQ-84) for the oxide tape playback.
A34 : COS EQ VR (OXIDE-C)	3-114	Adjusts the chroma signal equalizer (EQ-84) for the oxide tape playback.
A35 : G-BAND/OMC DC VR	3-115	Adjusts the guard band width and the DC offset level of an overmodulation compensation circuit.
A36 : DO TH/ENV TH VR	3-115	Adjusts the threshold level of a dropout and the threshold level of an RF envelope.
A37 : OMC LIM BALANCE VR	3-116	Adjusts the limiter balance of the overmodulation compensator.
A38 : DEMO BAL/ETC. VR	3-116	Adjusts the balance of the demodulator, etc.
A3F : NV-RAM CONTROL	3-117	Save the adjustment data above. (A3 : BETACAM PB (DM) and A4 : BETACAM PB (TBC))

Title (Alternative mode)	Page	Description
A30 : RF GAIN VR (EQ VR)	3-113	Adjusts the gain of an analog Betacam PB RF amplifier (EQ-84).
A31 : COS EQ VR (METAL)	3-114	Adjusts the Y signal equalizer (EQ-84) for the metal tape playback.
A32 : COS EQ VR (METAL)	3-114	Adjusts the chroma signal equalizer (EQ-84) for the oxide tape playback.
A33 : G-BAND VR	3-115	Adjusts the guard band width and the DC offset level of an overmodulation compensation circuit.
A34 : DO TH VR	3-115	Adjusts the threshold level of a dropout and the threshold level of an RF envelope.
A3F : NV-RAM CONTROL	3-117	Save the adjustment data above. (A3 : BETACAM PB (DM) and A4 : BETACAM PB (TBC))

A4 : BETACAM PB (TBC)

This mode is used to adjust the TBC system based on a Betacam/Betacam SP format.
For more details, refer to Section 3-3-6.
This mode also consists of two types of menu structure. See the description in A3 : BETACAM PB (DM).

(For NTSC model)

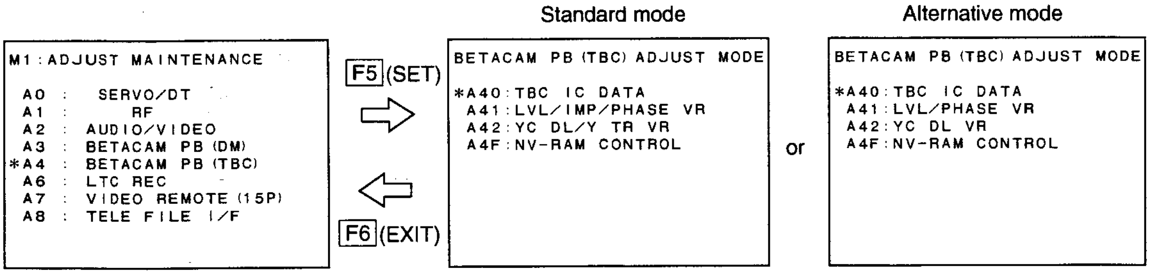


```
M1 : ADJUST MAINTENANCE

 A0  :   SERVO/DT
 A1  :     RF
 A2  :  AUDIO/VIDEO
 A3  :  BETACAM PB (DM)
*A4  :  BETACAM PB (TBC)
 A6  :  LTC REC
 A7  :  VIDEO REMOTE (15P)
 A8  :  TELE FILE I/F
```

```
BETACAM PB (TBC) ADJUST MODE

*A40:TBC IC DATA
 A41:LVL/IMP/PHASE VR
 A42:YC DL VR
 A4F:NV-RAM CONTROL
```

```
BETACAM PB (TBC) ADJUST MODE

*A40:TBC IC DATA
 A41:LVL/PHASE VR
 A42:YC DL/Y TR VR
 A4F:NV-RAM CONTROL
```

(For PAL model)



```
M1 : ADJUST MAINTENANCE

 A0  :   SERVO/DT
 A1  :     RF
 A2  :  AUDIO/VIDEO
 A3  :  BETACAM PB (DM)
*A4  :  BETACAM PB (TBC)
 A6  :  LTC REC
 A7  :  VIDEO REMOTE (15P)
 A8  :  TELE FILE I/F
```

```
BETACAM PB (TBC) ADJUST MODE

*A40:TBC IC DATA
 A41:LVL/IMP/PHASE VR
 A42:YC DL/Y TR VR
 A4F:NV-RAM CONTROL
```

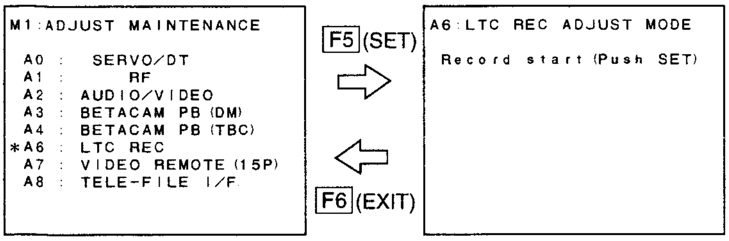
```
BETACAM PB (TBC) ADJUST MODE

*A40:TBC IC DATA
 A41:LVL/PHASE VR
 A42:YC DL VR
 A4F:NV-RAM CONTROL
```

Title (Standard mode)	Page	Description
A40 : TBC IC DATA	3-119	Sets the read clock timing and the data of a PB VISC phase detection circuit in the TBC block.
A41 : LVL/IMP/PHASE VR	3-119	Adjusts the AD converter level, impact error offset PB video phase and fine adj. of the PB VISC phase detector.
For NTSC model: A42 : YC DL VR	3-119	Adjusts the YC delay.
For PAL model: A42 : YC DL/Y TR VR	3-119	Adjusts the YC delay and the tracking offset in the shuttle mode.
A4F : NV-RAM CONTROL	3-120	Saves the adjustment/setting data above. (A3 : BETACAM PB (DM) and A4 : BETACAM (TBC))

Title (Alternative mode)	Page	Description
A40 : TBC IC DATA	3-119	Sets the read clock timing data.
A41 : LVL/PHASE VR	3-119	Adjusts the AD converter level and the PB video phase.
For NTSC model: A42 : YC DL/Y TR VR	3-119	Adjusts the YC delay and the tracking offset in the shuttle mode.
For PAL model: A42 : YC DL VR	3-119	Adjusts the YC delay.
A4F : NV-RAM CONTROL	3-120	Saves the adjustment/setting data above. (A3 : BETACAM PB (DM) and A4 : BETACAM (TBC))

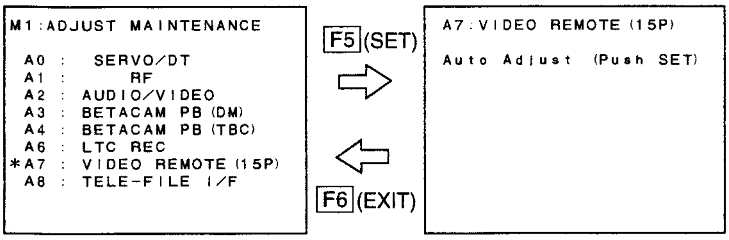
A6 : LTC REC

This mode is exclusive for the player used to adjust the shot mark recording circuit.
For more details, refer to Section 3-3-7.


M1 :ADJUST MAINTENANCE
A0 : SERVO/DT
A1 : RF
A2 : AUDIO/VIDEO
A3 : BETACAM PB (DM)
A4 : BETACAM PB (TBC)
*A6 : LTC REC
A7 : VIDEO REMOTE (15P)
A8 : TELE-FILE I/F
F5 (SET)
F6 (EXIT)
A6 : LTC REC ADJUST MODE
Record start (Push SET)

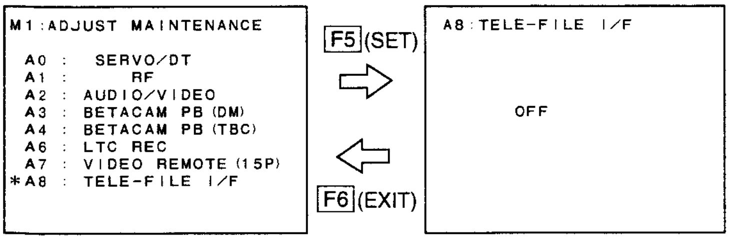
A7 : VIDEO REMOTE (15P)

Saves the voltage level input from the 15-pin VIDEO CONTROL connector. The voltage to be saved is equal to the voltage to set the video output to the preset value (UNITY).
For more details, refer to Section 3-3-8.


M1 :ADJUST MAINTENANCE
A0 : SERVO/DT
A1 : RF
A2 : AUDIO/VIDEO
A3 : BETACAM PB (DM)
A4 : BETACAM PB (TBC)
A6 : LTC REC
*A7 : VIDEO REMOTE (15P)
A8 : TELE-FILE I/F
F5 (SET)
F6 (EXIT)
A7 : VIDEO REMOTE (15P)
Auto Adjust (Push SET)

A8 : TELE-FILE I/F

Menu for supplying power to the Tele-File circuit during Tele-File adjustment.
For more details, refer to Section 3-3-9.


M1 :ADJUST MAINTENANCE
A0 : SERVO/DT
A1 : RF
A2 : AUDIO/VIDEO
A3 : BETACAM PB (DM)
A4 : BETACAM PB (TBC)
A6 : LTC REC
A7 : VIDEO REMOTE (15P)
*A8 : TELE-FILE I/F
F5 (SET)
F6 (EXIT)
A8 : TELE-FILE I/F
OFF

3-3-2. SERVO/DT Adjustment Mode (A0)

The A0 : SERVO/DT mode is used to adjust the servo and DT system.

- M1 : ADJUST MAINTENANCE
  - A0 : SERVO/DT
    - A00 : SERVO ADJUST
      - A000 : A001-A00A ADJUST
      - A001 : S REEL FG DUTY
      - A002 : T REEL FG DUTY
      - A003 : CAPSTAN FG DUTY
      - A004 : S REEL OFFSET/FRICTION
      - A005 : T REEL OFFSET/FRICTION
      - A006 : S REEL TORQUE
      - A007 : T REEL TORQUE
      - A008 : CAPSTAN QPL GAIN
      - A009 : T REEL QPL GAIN
      - A00A : S/T TENSION OFFSET
      - A00B : RF SWITCHING POS.
      - A00F : NV-RAM CONTROL
    - A01 : DT ADJUST
      - A010 : ANALOG DT ADJUST
      - A011 : DIGITAL DT ADJUST
      - A01F : NV-RAM CONTROL

Menu Tree of SERVO/DT Adjustment Mode

Note

When the unit has a cassette tape, the cassette tape is automatically ejected on shifting to the A00 or A01 mode.

A00 : SERVO ADJUST

This mode is used to adjust the servo system.

A01 : DT ADJUST

This mode is used to adjust the DT system.

A000 : A001-A00A ADJUST

This menu is used to execute the adjustment menus below automatically and continuously.

A001 : S REEL FG DUTY
A002 : T REEL FG DUTY
A003 : CAPSTAN FG DUTY
A004 : S REEL OFFSET/FRICTION
A005 : T REEL OFFSET/FRICTION
A006 : S REEL TORQUE
A007 : T REEL TORQUE
A008 : CAPSTAN QPL GAIN
A009 : T REEL QPL GAIN
A00A : S/T TENSION OFFSET

Note

During executing menu A009, a noise sound occurs. The noise is caused by resonance of the T reel table on adjusting. But it is not abnormal.

To execute the adjustment menu

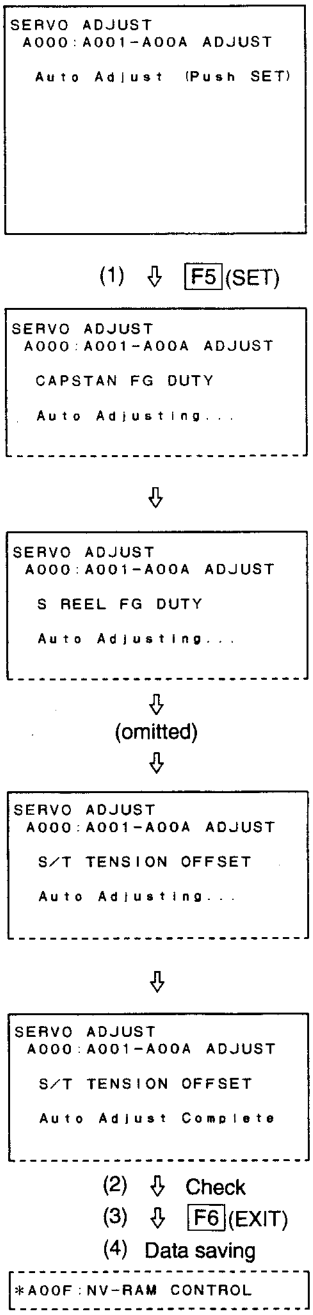
(1) Press the F5 (SET) button to initiate the automatic adjustment.
  - The execution time is about 180 seconds.
  - During the adjustment, the adjustment menu name in execution and a message "Auto Adjusting..." will be displayed on the superimposed display.
  - A message "Auto Adjust Complete" will be momentarily displayed on completing each adjustment.
    If the auto adjustment fails, a message "Auto Adjust Failure" will be displayed halfway. In this case, refer to the "For Automatic Adjustment Failure (A000 to A00B)" on page 3-66.

(2) Check the adjustment result.
  - When all adjustments are completed normally, the message "Auto Adjust Complete" is continuously displayed .

(3) To exit the menu, press the F6 (EXIT) button once.

(4) To save the adjustment data, execute the SAVE SERVO ADJUST DATA in A00F : NV-RAM CONTROL menu.

Example of display and operation



Superimposed display

```
SERVO ADJUST
 A000:A001-A00A ADJUST

  Auto Adjust (Push SET)
```

(1) ⇩ F5(SET)

```
SERVO ADJUST
 A000:A001-A00A ADJUST

  CAPSTAN FG DUTY

  Auto Adjusting...
```

⇩

```
SERVO ADJUST
 A000:A001-A00A ADJUST

  S REEL FG DUTY

  Auto Adjusting...
```

⇩
(omitted)
⇩

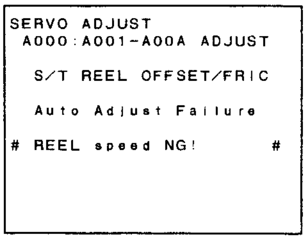
```
SERVO ADJUST
 A000:A001-A00A ADJUST

  S/T TENSION OFFSET

  Auto Adjusting...
```

⇩

```
SERVO ADJUST
 A000:A001-A00A ADJUST

  S/T TENSION OFFSET

  Auto Adjust Complete
```

(2) ⇩ Check
(3) ⇩ F6(EXIT)
(4) Data saving

```
*A00F:NV-RAM CONTROL
```



```
SERVO ADJUST
 A000:A001-A00A ADJUST

  S/T REEL OFFSET/FRIC

  Auto Adjust Failure

# REEL speed NG!        #
```

Ex.: When failing the automatic adjustment

A001 : S REEL FG DUTY
A002 : T REEL FG DUTY
A003 : CAPSTAN FG DUTY
A004 : S REEL OFFSET/FRICTION
A005 : T REEL OFFSET/FRICTION
A006 : S REEL TORQUE
A007 : T REEL TORQUE
A008 : CAPSTAN QPL GAIN
A009 : T REEL QPL GAIN
A00A : S/T TENSION OFFSET

These menus are used to perform the automatic adjustments below.

A001 : S reel FG duty adjustment
A002 : T reel FG duty adjustment
A003 : Capstan FG duty adjustment
A004 : S reel offset/friction adjustment
A005 : T reel offset/friction adjustment
A006 : S reel torque adjustment
A007 : T reel torque adjustment
A008 : Capstan QPL gain adjustment
A009 : T reel QPL gain adjustment
A00A : S/T tension offset adjustment

Note

During executing menu A009, a noise sound occurs. The noise is caused by resonance of the T reel table on adjusting. But it is not abnormal.

To execute the automatic adjustments

(1) Press the F5 (SET) button to initiate the automatic adjustment.
- The execution time is about 15 seconds for A001 to A003 and about 20 seconds for others.
- During the adjustment, a message "Auto Adjusting..." will be displayed.

(2) Check the adjustment result.
- On completing the automatic adjustment, a message "Auto Adjust Complete" will be displayed.
- If the automatic adjustment fails, a message "Auto Adjust Failure" will be displayed. In this case, refer to the "For Automatic Adjustment Failure (A000 to A00B)" on page 3-66.

(3) To exit the menu, press the F6 (EXIT) button once.

(4) To save the adjustment data, execute the SAVE SERVO ADJUST DATA in A00F : NV-RAM CONTROL menu.

Example of display and operation

Example of A001 : S REEL FG DUTY

```
SERVO ADJUST
 A001 : S REEL FG DUTY

  Auto Adjust (Push SET)
```

(1) ⇩ F5(SET)

```
SERVO ADJUST
 A001 : S REEL FG DUTY

  S REEL FG DUTY

  Auto Adjusting...
```

⇩

```
SERVO ADJUST
 A001 : S REEL FG DUTY

  S REEL FG DUTY

  Auto Adjust Complete
```

(2) ⇩ Check
(3) ⇩ F6(EXIT)
(4) Data saving

```
*A00F : NV-RAM CONTROL
```

```
SERVO ADJUST
 A001 : S REEL FG DUTY

  S REEL FG DUTY

  Auto Adjust Failure

# S REEL FG (B) NG !        #
```

Ex.: When failing the automatic adjustment

A00B : RF SWITCHING POS.

This menu is used to adjust the RF switching position.

Notes

- The SAT ENV GAIN adjustment is executed at the same time for the recorder.
- Be sure to adjust in either 525 or 625 mode. It is not necessary to perform this adjustment in both modes.
- When 24P recording is available in the HDW series, adjustments in the 59.94 Hz or 50 Hz mode and adjustments in the 24 Hz mode are required.
- Following alignment tape rewound to the tape beginning in advance is required for this adjustment.

HDW recorder :	HR2-1A
HDW player :	HR5-1A
DVW-2000/M2000 :	ZR2-1
DVW-2000P/M2000P :	ZR2-1P
MSW recorder :	MR2-1P
MSW-M2100/M2100E :	MR5-1
MSW-M2100P/M2100EP :	MR5-1P

If the specified cassette tape is not used, the adjustment cannot be properly performed even if a message “Auto Adjust Complete” is displayed when the adjustment finishes.

To execute the automatic adjustment

(1) Press F5 (SET) button.

(2) Insert the alignment tape rewound to the tape beginning.

- The adjustment starts on inserting the alignment tape.
- During the automatic adjustment, a message “Auto Adjusting...” is displayed on only the superimposed display.

(3) Check the adjustment result.

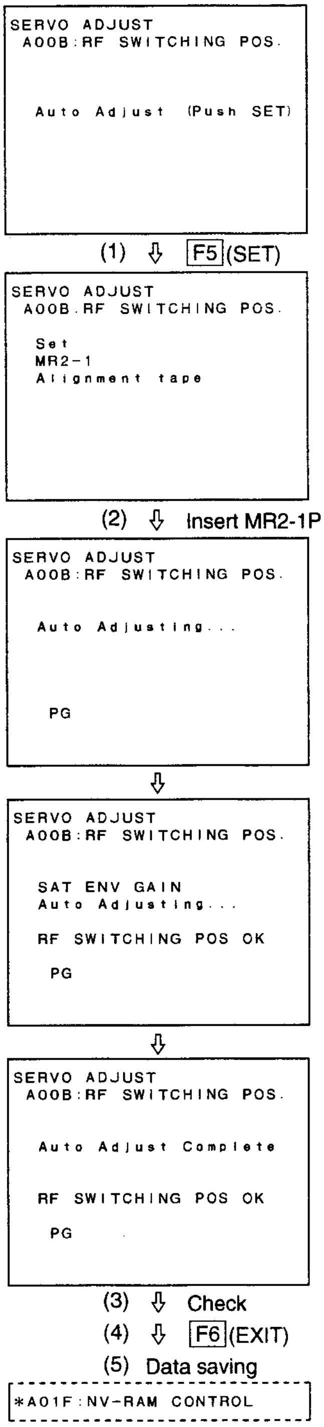
- On completing the automatic adjustment, a message “Auto Adjust Complete” is displayed and the alignment tape is automatically ejected.
- If the automatic adjustment fails, a message “Auto Adjust Failure” is be displayed. In this case, refer to the “For Automatic Adjustment Failure (A000 to A00B)” on next page.

(4) To exit the menu, press the F6 (EXIT) button.

(5) To save the adjustment data, execute SAVE SERVO ADJUST DATA in A01F : NV-RAM CONTROL menu.

Example of display and operation (For MSW recorder)

Superimposed display



```
SERVO ADJUST
 A00B:RF SWITCHING POS.

 Auto Adjust (Push SET)
```

(1) ⇩ F5 (SET)

```
SERVO ADJUST
 A00B.RF SWITCHING POS.

 Set
 MR2-1
 Alignment tape
```

(2) ⇩ Insert MR2-1P

```
SERVO ADJUST
 A00B:RF SWITCHING POS.

 Auto Adjusting...

  PG
```

⇩

```
SERVO ADJUST
 A00B:RF SWITCHING POS.

 SAT ENV GAIN
 Auto Adjusting...

 RF SWITCHING POS OK

  PG
```

Not displayed for player.

⇩

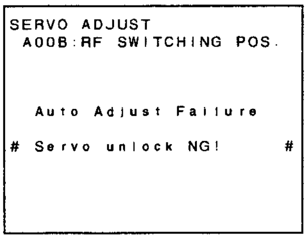
```
SERVO ADJUST
 A00B:RF SWITCHING POS.

 Auto Adjust Complete

 RF SWITCHING POS OK

  PG
```

(3) ⇩ Check

(4) ⇩ F6 (EXIT)

(5) Data saving

*A01F:NV-RAM CONTROL



```
SERVO ADJUST
 A00B:RF SWITCHING POS.

 Auto Adjust Failure

# Servo unlock NG!      #
```

Ex.: When failing the automatic adjustment

For Automatic Adjustment Failure (A000 to A00B)

The circuit in which failure occurred can be traced to some degree by the trouble message displayed together when the message "Auto Adjust Failure" is displayed during execution of adjustment menus A000 to A00B.

Note

The trouble message display indicates that no adjustment could be performed because the circuit described in this manual did not operate normally. Moreover, other circuits (e.g., control signal system) in which failure actually occurred may also exist.

A000 : A001-A00A ADJUST

Refer to the description of A001 to A00A.

A001 : S REEL FG DUTY

When "# S REEL FG ( ) NG! #" is displayed:

⇨ Check the S reel FG amplifier circuit on the SS-89 board.

⇨ Check the S reel motor driver circuit on the DR-414/508 board.

A002 : T REEL FG DUTY
A009 : T REEL QPL GAIN

When "# T REEL FG ( ) NG! #" is displayed:

⇨ Check the T reel FG amplifier circuit on the SS-89 board.

⇨ Check the T reel motor driver circuit on the DR-414/508 board.

A003 : CAPSTAN FG DUTY
A008 : CAPSTAN QPL GAIN

When "CAPSTAN FG AMP TROUBLE" is displayed:

⇨ Check the capstan FG amplifier circuit on the SS-89 board.

⇨ Check the capstan motor driver circuit on the DR-414/508 board.

A004 : S REEL OFFSET/FRICTION
A006 : S REEL TORQUE

When "# S REEL TROUBLE #" is displayed:

⇨ Execute the S reel FG duty adjustment (A001 : S REEL FG DUTY) again.

⇨ Check the S reel motor driver circuit on the DR-414/508 board.

A005 : T REEL OFFSET/FRICTION
A007 : T REEL TORQUE

When "# T REEL TROUBLE #" is displayed:

⇨ Execute the T reel FG duty adjustment (A002 : T REEL FG DUTY) again.

⇨ Check the T reel motor driver circuit on the DR-414/508 board.

A00A : S/T TENSION OFFSET

When "S REEL DRIVER TROUBLE" is displayed:

⇨ Check the S tension detection circuit on the SS-89 board.

⇨ Check the S reel motor driver circuit on the DR-414/508 board.

When "T REEL DRIVER TROUBLE" is displayed:

⇨ Check the T tension detection circuit on the SS-89 board.

⇨ Check the T reel motor driver circuit on the DR-414/508 board.

A00B : RF SWITCHING POS.

Check to see that the played back tape is the following alignment tape.

HDW recorder :	HR2-1A
HDW player :	HR5-1A
DVW-2000/M2000 :	ZR2-1
DVW-2000P/M2000P :	ZR2-1P
MSW recorder :	MR2-1P
MSW-M2100/M2100E :	MR5-1
MSW-M2100P/M2100EP :	MR5-1P

When "# SERVO UNLOCKED NG #" is displayed:

⇨ Check the servo system.

C010 : S REEL   C014 : CAPSTAN
C011 : T REEL   C015 : DRUM

⇨ Check the FG amplifier circuit and the driver circuit of the device considered abnormal.

When "# SW' POS. RANGE OVER #" is displayed:

⇨ **Recorder:**
Check that the waveform of the EQ_REC_AC_PH signal fed to the SS-89 board is same as that of ENV of the alignment tape and it is clern.

⇨ **Player:**
Check that the EQ_TRACKING_REF1 signal fed to the SS-89 board consists of pulsed. When no pulse exists, check the EQ-84 board.

When "# SAT EVE ADJUST NG #" is displayed:
(for the recorder only)

⇨ Check that the waveform of the SAT ENV is fed to TP300 on the SS-89 board.

- When the waveform is fed: Check the SS-89 board.
- When no waveform is fed: Check the EQ-84 board.

A00F : NV-RAM CONTROL

This menu is used to save the servo adjustment data adjusted in the A00 : SERVO ADJUST mode.

CAUTION

Do not save the adjustment data into the NV-RAM when abnormality is found during automatic adjustment (when the message "Auto Adjust Failure" is displayed).

Note

When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To save the data

(1) Turn the MULTI CONTROL knob to set the * mark to "SAVE SERVO ADJUST DATA" on the superimposed display.

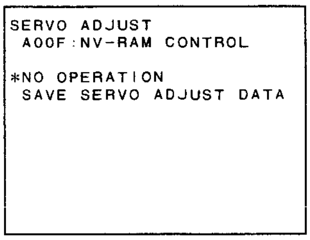
(2) Press the F5 (SET) button to execute the data save.
- On pressing it, the data transmission is initiated. The data transmission time is about ten seconds.
- During the data transmission, a message "Saving..." will be displayed.

(3) Check that the data transmission is completed.
- On completing the data transmission, a message "Save Complete" will be displayed.

(4) To exit the menu, press the F6 (EXIT) button once.

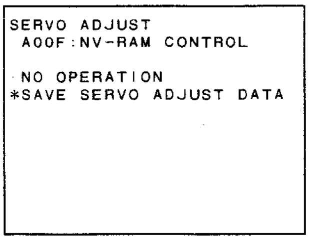
Example of display and operation

Superimposed display



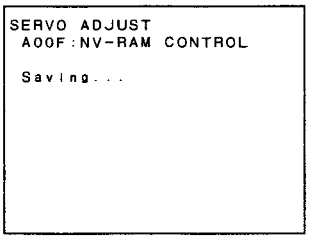
```
SERVO ADJUST
 A00F:NV-RAM CONTROL

*NO OPERATION
 SAVE SERVO ADJUST DATA
```

(1) ⇩ MULTI CONTROL



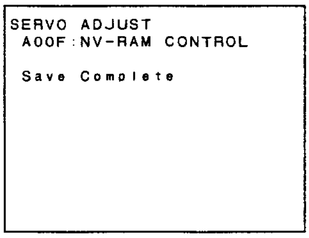
```
SERVO ADJUST
 A00F:NV-RAM CONTROL

 NO OPERATION
*SAVE SERVO ADJUST DATA
```

(2) ⇩ F5(SET)



```
SERVO ADJUST
 A00F:NV-RAM CONTROL

 Saving...
```

⇩



```
SERVO ADJUST
 A00F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ F6(EXIT)

A010 : ANALOG DT ADJUST

This menu is used to adjust the offset levels and gains of the DT system for analog Betacam playback.
This menu is displayed for the unit that can play back the analog Betacam.

Note

- Be sure to adjust in either 525 or 625 mode. It is not necessary to perform this adjustment in both systems.
- Use the alignment tape specified. If the specified alignment tape is not used, the adjustment cannot be properly performed even if a message "Auto Adjust Complete" is displayed on completing the adjustment.

To execute the adjustment

(1) Prepare the following alignment tape located in the beginning of the color-bar portion.
In 525 mode: CR5-1B (TC 00 : 00 : 14 : 00)
or CR5-2A (TC 00 : 00 : 00 : 00)
In 625 mode: CR5-1BPS (TC 00 : 00 : 14 : 00)
or CR5-2APS (TC 00 : 00 : 00 : 00)

(2) Press the F5 (SET) button once and insert the alignment tape into this unit.
- Insert the alignment tape to initiate the automatic adjustment.
- During the automatic adjustment, a message "Auto Adjusting..." will be displayed.
- On completing the DT offset automatic adjustment, the DT gain automatic adjustment will be initiated.

(3) Check the result of checking.
- On completing the automatic adjustment, a message "Auto Adjust Complete" will be displayed.
- If the automatic adjustment fails, a message "Auto Adjust Failure" is displayed. In this case, refer to "When failing the automatic adjustment (A010)" on the next page.

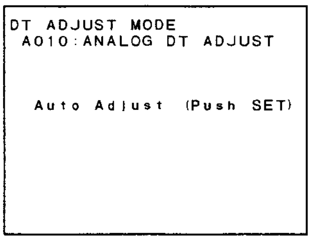
(4) To exit the menu, press the F6 (EXIT) button once.

(5) To save the adjustment data, execute the SAVE ANALOG DT DATA in A01F : NV-RAM CONTROL menu.

Note

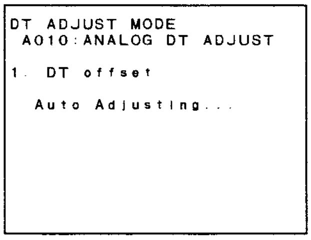
The alignment tape will automatically be ejected in returning to the A0 : SERVO/DT mode screen.

Example of display and operation



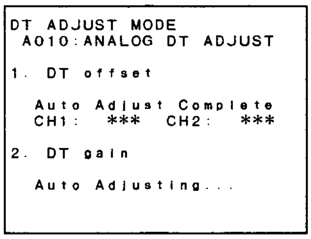
```
DT ADJUST MODE
 A010:ANALOG DT ADJUST


  Auto Adjust  (Push SET)
```

(2) ⇩ F5 (SET)
⇩ Insert the alignment tape



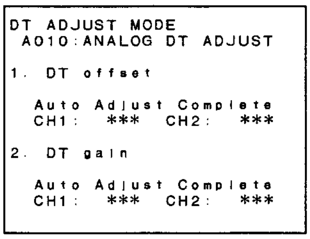
```
DT ADJUST MODE
 A010:ANALOG DT ADJUST
1. DT offset
  Auto Adjusting...
```

⇩



```
DT ADJUST MODE
 A010:ANALOG DT ADJUST
1. DT offset
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
2. DT gain
  Auto Adjusting...
```

⇩

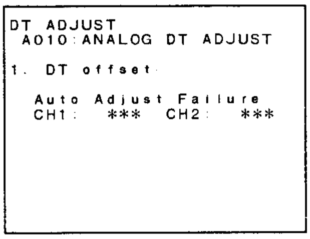


```
DT ADJUST MODE
 A010:ANALOG DT ADJUST
1. DT offset
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
2. DT gain
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
```

(3) ⇩ Check
(4) ⇩ F6 (EXIT)
(5) Data saving

*A01F:NV-RAM CONTROL

When failing the automatic adjustment (A010)



```
DT ADJUST
 A010:ANALOG DT ADJUST
1. DT offset

  Auto Adjust Failure
  CH1:   ***   CH2:   ***
```

Ex.: When failing the automatic adjustment

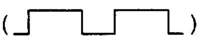
If the message “Auto Adjust Failure” is displayed during the automatic adjustment, perform the following check.

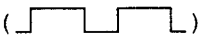
(1) Check the analog DT system by C040 : ANALOG DT of C04 : DT CHECK. (Refer to Section 3-2-2.)

(2) When no malfunction was found in the check of step (1), perform the adjustment again. If the automatic adjustment fails, perform step (a) or (b).

(a) When DT offset adjustment has been NG:
Confirm that RF ENVELOPE signal exists at TP700/701 on the SS-89 board.
- Not exist ; Check the DM-123 board.
- Exists ; Check the SS-89 board.

(b) When DT gain adjustment has been NG:
Confirm that the signal at pins 99 and 100 of CN123 on the SS-89 board are synchronized.
Actually, draw out the SS-89 board with the extension board and check TP A-63 and TP A-64 on the extension board.

SS-89 board CN123-99 : Y WZ
Extension board TP A-63 

SS-89 board CN123-100 : C WZ
Extension board TP A-64 

- The no signals exist or are synchronized :
  ⇨ Check the DM-123 and EQ-84 boards.
- The signal exists and are synchronized :
  ⇨ Check the SS-89 board.

A011 : DIGITAL DT ADJUST

This menu is used to adjust the offset levels and gains of the digital DT playback.

Notes

- For HDW series and MSW series, perform this adjustment in either of 525 or 625 mode. It is not necessary to perform this adjustment in both modes. On performing it in either system, the other system adjustment data are automatically updated.
- Following alignment tape located to time code 00 : 10 : 00 : 00 in advance is required for this adjustment.

HDW series :	HR5-1A
DVW series (NTSC model) ;	ZR5-1
DVW series (PAL model) ;	ZR5-1P
MSW series (NTSC model) :	MR5-1
MSW series (PAL model) :	MR5-1P

If the specified alignment tape is not used, the adjustment cannot be properly performed even if a message "Auto Adjust Complete" is displayed on completing the adjustment.

To execute the adjustment

(1) Prepare alignment tape located in the beginning of the color-bar portion.

(2) Press the F5 (SET) button once and insert the alignment tape into this unit.
  - Insert the alignment tape to initiate the automatic adjustment.
  - During the automatic adjustment, a message "Auto Adjusting..." will be displayed.
  - On completing the DT offset automatic adjustment, the DT gain automatic adjustment will be initiated.

(3) Check the result of checking.
  - On completing the automatic adjustment, a message "Auto Adjust Complete" will be displayed.
  - If the automatic adjustment fails, a message "Auto Adjust Failure" is displayed. In this case, refer to "When failing the automatic adjustment (A011)" on the next page.

(4) To exit the menu, press the F6 (EXIT) button once.

(5) To save the adjustment data, execute the SAVE IMX DT DATA in A01F : NV-RAM CONTROL menu.

Note

The alignment tape will automatically be ejected in returning to the A0 : SERVO/DT mode screen.

Example of display and operation

```
DT ADJUST MODE
 A011:DIGITAL DT ADJUST

  Auto Adjust (Push SET)
```

(2) ⇩ F5 (SET)
⇩ Insert the alignment tape

```
DT ADJUST MODE
 A011:DIGITAL DT ADJUST
1 DT offset
  Auto Adjusting...
```

⇩

```
DT ADJUST MODE
 A011:DIGITAL DT ADJUST
1. DT offset
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
2. DT gain
  Auto Adjusting...
```

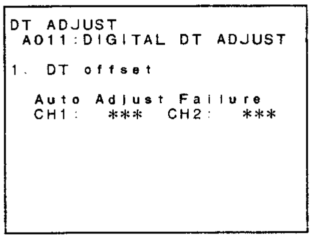
⇩

```
DT ADJUST MODE
 A011:DIGITAL DT ADJUST
1. DT offset
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
2. DT gain
  Auto Adjust Complete
  CH1:   ***   CH2:   ***
```

(3) ⇩ Check
(4) ⇩ F6 (EXIT)
(5) Data saving

```
*A01F:NV-RAM CONTROL
```

When failing the automatic check (A011)



```
DT ADJUST
 A011:DIGITAL DT ADJUST
1. DT offset

  Auto Adjust Failure
  CH1:  ***  CH2:  ***
```

Ex.: When failing the automatic adjustment

If the message "Auto Adjust Failure" is displayed during the automatic adjustment, perform the following check.

(1) Check the digital DT system by C041 : DIGITAL DT CHECK. (Refer to Section 3-2-2.)
(2) When no malfunction was found in the check of step (1), perform the adjustment again. If the automatic adjustment fails, perform step (a) or (b).

(a) When DT offset adjustment has been NG:
Confirm that Y RF ENVELOPE signal exists at TP700/701 on the SS-89 board.
- Not exist; Check the DPR-155/229 board.
- Exists; Check the SS-89 board.

(b) When DT again adjustment has been NG:
Check the SS-89 board and DT-47 board.

A01F : NV-RAM CONTROL

This menu is used to save the adjustment data adjusted in the A01 : DT ADJUST mode.

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (when the message "Auto Adjust Failure" is displayed).

Note

When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To save the data

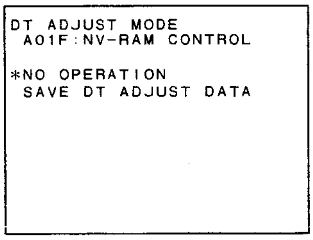
(1) Turn the MULTI CONTROL knob to set the * mark to "SAVE DT ADJUST DATA".

(2) Press the F5 (SET) button to execute the data save.
- On pressing it, the data transmission is initiated.
- During the data transmission, a message "Saving..." will be displayed on the superimposed display.

(3) Check that the data transmission is completed.
- On completing the data transmission, a message "Save Complete" will be displayed on the superimposed display.

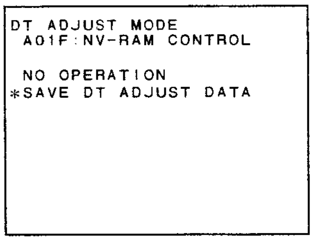
(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation



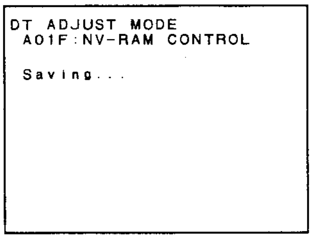
```
DT ADJUST MODE
 A01F:NV-RAM CONTROL

*NO OPERATION
 SAVE DT ADJUST DATA
```

(1) ⇩ MULTI CONTROL



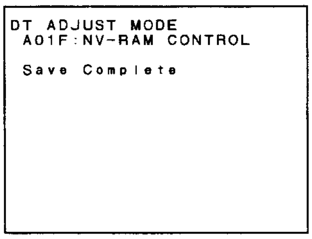
```
DT ADJUST MODE
 A01F:NV-RAM CONTROL

 NO OPERATION
*SAVE DT ADJUST DATA
```

(2) ⇩ F5 (SET)



```
DT ADJUST MODE
 A01F:NV-RAM CONTROL

 Saving...
```

⇩



```
DT ADJUST MODE
 A01F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check

(4) ⇩ F6 (EXIT)

3-3-3. RF Adjustment Mode (A1)

The A1 : RF mode is used to adjust the RF system. Two menus for several digital recording formats are available.

- M1 : ADJUST MAINTENANCE
  - A1 : RF
    - A10 : SX RF ADJUST
      - A101 : EQUALIZER
      - A103 : PLAY PLL
      - A104 : FWD PLL
      - A105 : REV PLL
      - A106 : A/D GAIN
      - A107 : A101-A106 ALL ADJ
    - A11 : IMX RF ADJUST
      - A111 : EQUALIZER
      - A112 : REC CURRENT (MSW recorder only)
      - A113 : PLAY PLL
      - A114 : FWD PLL
      - A115 : REV PLL
      - A116 : A/D GAIN
      - A117 : A111-A116 ALL ADJ
    - A12 : DB RF ADJUST
      - A121 : EQUALIZER
      - A122 : REC CURRENT (DVW recorder only)
      - A123 : PLAY PLL
      - A124 : FWD PLL
      - A125 : REV PLL
      - A126 : A/D GAIN
      - A127 : A121-A126 ALL ADJ
    - A13 : HD RF ADJUST
      - A131 : EQUALIZER
      - A132 : REC CURRENT (HDW recorder only)
      - A133 : PLAY PLL
      - A134 : FWD PLL
      - A135 : REV PLL
      - A136 : A/D GAIN
      - A137 : A131-A136 ALL ADJ
    - A14 : x2 RF ADJUST
      - A141 : EQUALIZER
      - A143 : PLAY PLL
      - A146 : A/D GAIN
      - A147 : A141-A146 ALL ADJ
    - A1F : NV-RAM CONTROL

Menu Tree of RF Adjustment Mode

Notes

- If abnormally exists in the servo system, each menu in A1 : RF mode does not function properly.
- When a cassette tape other than the specified format is inserted, it will automatically be ejected.

A10 : SX RF ADJUST

This mode is used to adjust the RF system of Betacam SX format and displayed for the unit that can play back the Betacam SX format.

A11 : IMX RF ADJUST

This mode is used to adjust the RF system of MPEG IMX format and displayed for the unit that can play back the MEPG IMX format.

A12 : DB RF ADJUST

This mode is used to adjust the RF system of Digital Betacam format and displayed for the unit that can play back the Digital Betacam format.

A13 : HD RF ADJUST

This mode is used to adjust the RF system of HDCAM format and displayed for the unit that can play back the HDCAM format.

A14 : x2 RF ADJUST

Adjustment mode for RF system of MPEG IMX format ×2 playback.
Displayed for only models having MPEG IMX-format ×2 playback function.

A1F : NV-RAM CONTROL

This menu is used to save at one time the RF adjustment data adjusted in each format into the NV-RAM.
The adjustment data is saved only for formats that have been adjusted.

A101 : EQUALIZER
A103 : PLAY PLL
A104 : FWD PLL
A105 : REV PLL
A106 : A/D GAIN

These menus are used to adjust the RF system of the Betacam SX format automatically.

Note

Displays are examples while pressing the STOP button. Actually, each adjustment data is displayed at the "xx" portion.

A101 : EQUALIZER

This menu automatically adjusts the PB RF levels (VC) and PB equalizer gain (EQ) and phase (PH) for the PB heads (channels A1, B1, A5, B5, A2, B2, A6 and B6).

```
     SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust  (Push SET)

 ch  RSLT     ch  RSLT
 A1           B1
 A5           B5
 A2           B2
 A6           B6
*ALL
```

```
     SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust  (Push SET)

 ch VC EQ PH ch VC EQ PH
 A1 xx xx xx B1 xx xx xx
 A5 xx xx xx B5 xx xx xx
 A2 xx xx xx B2 xx xx xx
 A6 xx xx xx B6 xx xx xx
*ALL
```

A103 : PLAY PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for PLAY mode.

```
     SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust  (Push SET)

 ch  RSLT     ch  RSLT
 A1/5         B1/5
 A2/6         B2/6
*ALL
```

```
     SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust  (Push SET)

 ch   VR      ch   VR
 A1/5 xx      B1/5 xx
 A2/6 xx      B2/6 xx
*ALL
```

A104 : FWD PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for FWD mode.

```
     SX RF ADJUST MODE
A104:FWD PLL

 Auto Adjust  (Push SET)

 ch  RSLT     ch  RSLT
 A1/5         B1/5
 A2/6         B2/6
*ALL
```

```
     SX RF ADJUST MODE
A104:FWD PLL

 Auto Adjust  (Push SET)

 ch   VR      ch   VR
 A1/5 xx      B1/5 xx
 A2/6 xx      B2/6 xx
*ALL
```

A105 : REV PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for REV mode.

```
     SX RF ADJUST MODE
A105:REV PLL

 Auto Adjust  (Push SET)

 ch  RSLT     ch  RSLT
 A1/5         B1/5
 A2/6         B2/6
*ALL
```

```
     SX RF ADJUST MODE
A105:REV PLL

 Auto Adjust  (Push SET)

 ch   VR      ch   VR
 A1/5 xx      B1/5 xx
 A2/6 xx      B2/6 xx
*ALL
```

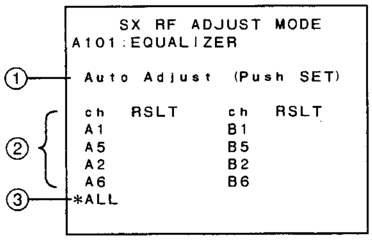
A106 : A/D GAIN

This menu automatically adjusts the gain in converting the PB RF signal from analog to digital.

```
     SX RF ADJUST MODE
A106:A/D GAIN

 Auto Adjust  (Push SET)

 ch  RSLT     ch  RSLT
 A1/5         B1/5
 A2/6         B2/6
*ALL
```

```
     SX RF ADJUST MODE
A106:A/D GAIN

 Auto Adjust  (Push SET)

 ch   VR      ch   VR
 A1/5 xx      B1/5 xx
 A2/6 xx      B2/6 xx
*ALL
```

Description of superimposed display



```
      SX RF ADJUST MODE
A101 :EQUALIZER

  Auto Adjust  (Push SET)

  ch   RSLT     ch   RSLT
  A1            B1
  A5            B5
  A2            B2
  A6            B6
*ALL
```

Ex. A101 : EQUALIZER

① The display in this line changes. Each display and its meaning are described below.

Auto Adjust(Push SET) :	Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Tracking ... :	Tracking is in an optimization process.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.
Condition NG :	Error condition defect.
Insert SR5-1 :	Requesting to insert the specified alignment tape

② To perform the automatic adjustment for single channel (circuit), select a channel name using an * mark.
The adjustment result (OK, NG, or FAIL) will be displayed on the right of the channel name.
"OK" : The channel was adjusted normally.
"NG" : The error condition of the channel was bad.
"FAIL" : The automatic adjustment failed.

Note

"RSLT" indicates the result.

The adjustment data in each channel (circuit) is displayed while pressing the STOP button except in adjusting.

CAUTION

Do not press the STOP button in adjusting. If pressing it in adjusting, the tape stops and the automatic adjustment becomes impossible.

③ To perform the automatic adjustment for all channels (circuit) at a time, select "ALL" using the * mark.
During the check, the adjustment result in each channel is displayed in area ②.
After the automatic adjustment in all channels is completed, the adjustment result (OK, NG, or FAIL) will be displayed on the right of "ALL".
"OK" : All channels (circuits) were "OK".
"NG" : Both "NG" and "OK" occurred in channels.
"FAIL" : One or more "FAIL" occurred in channels.

To execute the adjustment

(1) Insert the cassette tape specified in ①: SR5-1 (for 525 mode) or SR5-1P (for 625 mode)

Notes

- Be sure to use the specified alignment tape.
  If the specified cassette tape is not used, the adjustment cannot be properly performed even if the message "Auto Adjust Complete" is displayed on completing the adjustment.
- Take care that the tape transport mode does not change during automatic adjustment.
  Any adjustment cannot be properly performed in modes other than the tape transport mode that was set automatically. Moreover, in modes other than the tape transport mode, the automatic adjustment cannot be performed any longer or "FAIL" or "NG" is displayed as the adjustment result. Therefore, pay attention to the transport start position of the tape so that the end and beginning of the tape are not detected during adjustment. The minimum tape amount required for normal automatic adjustment is shown in the table on the next page. However, the tape amount increases or decreases when abnormality occurs.

Menu	Ordinary adjustment time	Tape amount required (Transport mode)
A101 : EQUALIZER Ⓣ	About 3 min./ALL, about 20 sec./channel	Adjustment time (PLAY)
A103 : PLAY PLL	About 15 sec./ALL, about 10 sec./circuit	Adjustment time (PLAY)
A104 : FWD PLL	About 10 sec.	About 10 min. (FWD)
A105 : REV PLL	About 10 sec.	About 11 min. (REV)
A106 : A/D GAIN Ⓣ	About 1 min./ALL, about 15 sec./circuit	Adjustment time (PLAY)

In a menu with Ⓣ, tracking operation is performed.

(2) Turn the MULTI CONTROL knob to set the * mark to the channel to be adjusted or ALL. Usually, select ALL.

(3) Press the F5 (SET) button to initiate the automatic adjustment.

- The automatic adjustment is initiated after automatically running the tape.
- During the automatic adjustment, the message "Auto Tracking ..." (only a menu in which tracking operation is performed) or "Auto Checking ..." will be displayed.

  Note

  When executing ALL adjustment in the menu in which tracking operation is carried out, the adjustment result of the channel is displayed every time one-channel (circuit) adjustment is completed.
- To cancel the automatic adjustment, press the F6 (EXIT) button once.
- When no cassette tape is inserted, the message "Insert SR5-1" will be displayed.

  In this case, insert the specified tape. The adjustment is then initiated after automatically running the tape.

Notes

- If the message "Auto Adjust (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be played back. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic adjustment is completed. Any adjustment cannot be properly performed if the tape transport state is changed by touching some button or search dial. In this case, the adjustment freezes or the adjustment result becomes "FAIL" or "NG".

(4) Check to see the result of automatic adjustment on the superimposed display.

- If no abnormality is found, "OK" will be displayed on the right of the selected channel (circuit) or "ALL".
- If "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on page 3-79.
- To see the adjustment data, press the STOP button.

  Note

  "OK", "NG", or "FAIL" is also displayed in the menu display area.

  The adjustment result for each channel (circuit) is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL adjustment.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the automatic adjustment again in this menu, go to step (2).

(6) To save the adjustment data, perform the following steps (7) and (8) .

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(7) Press the F6 (EXIT) button again.

(8) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Ex.: When ALL is selected
in A101 : EQUALIZER

```
   SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust  (Push SET)

 ch  RSLT      ch  RSLT
 A1            B1
 A5            B5
 A2            B2
 A6            B6
*ALL
```

(1) ⇩ Insert SR5-1/SR5-1P
(2) ⇩ Select
(3) ⇩ F5 (SET)

```
   SX RF ADJUST MODE    ☐
A101:EQUALIZER

 Auto Tracking ...

 ch  RSLT      ch  RSLT
 A1            B1
 A5            B5
 A2            B2
 A6            B6
*ALL
```

⇩

```
   SX RF ADJUST MODE    ☐
A101:EQUALIZER

 Auto Adjusting .......

 ch  RSLT      ch  RSLT
 A1            B1
 A5            B5
 A2            B2
 A6            B6
*ALL
```

⇩

```
   SX RF ADJUST MODE    ☐
A101:EQUALIZER

 Auto Adjust Complete

 ch  RSLT      ch  RSLT
 A1   OK       B1
 A5            B5
 A2            B2
 A6            B6
*ALL
```

⇩

(omitted)

⇩

```
   SX RF ADJUST MODE
A101:EQUALIZER

 Auto Adjust Complete

 ch  RSLT      ch  RSLT
 A1   OK       B1   OK
 A5   OK       B5   OK
 A2   OK       B2   OK
 A6   OK       B6   OK
*ALL  OK
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)
(6) ⇩
(7) ⇩ F6 (EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A103 : PLAY PLL

```
   SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust  (Push SET)

 ch  RSLT      ch  RSLT
 A1/5          B1/5
 A2/6          B2/6
*ALL
```

(1) ⇩ Insert SR5-1/SR5-1P
(2) ⇩ Select
(3) ⇩ F5 (SET)

```
   SX RF ADJUST MODE    ☐
A103:PLAY PLL

 Auto Adjusting

 ch  RSLT      ch  RSLT
 A1/5          B1/5
 A2/6          B2/6
*ALL
```

⇩

(omitted)

⇩

```
   SX RF ADJUST MODE
A103:PLAY PLL

 Auto Adjust  (Push SET)

 ch  RSLT      ch  RSLT
 A1/5 OK       B1/5 OK
 A2/6 OK       B2/6 OK
*ALL  OK
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)
(6) ⇩
(7) ⇩ F6 (EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

A107 : A101-A106 ALL ADJUST

This menu executes the automatic adjustment of A101 to A106 described previously in the following order.

A103 : PLAY PLL
A106 : A/D GAIN
A101 : EQUALIZER
A104 : FWD PLL
A105 : REV PLL

To execute the automatic adjustment

(1) Insert an alignment tape SR5-1 (for 525 mode) or SR5-1P (for 625 mode) rewound to the tape beginning.

Note

Be sure to use the specified alignment tape.
If the specified cassette tape is not used, the adjustment cannot be properly performed.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- The superimposed display during the automatic adjustment is displayed in the same way as when each adjustment is independently executed.
- The adjustment is completed in about five to six minutes unless "Condition NG" or "Auto Adjust Failure" does not occur.
- On completing the adjustment, the alignment tape stops with rewound to the tape beginning.

(3) Check to see that the message "Auto Adjust Complete" is displayed on the superimposed display.
When seeing the adjustment data, perform in each menu.

Note

If abnormality exists during adjustment, message "Condition NG" or "Auto Adjust Failure" is displayed in the same way as when the adjustment is executed independently.
The automatic adjustment stops in the adjustment menu. In the menu display area, a message "A107-ALL FAIL" or "A107-ALL NG" is displayed.
- If the message "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on next page.
- To check the adjustment data, press the STOP button.

(4) To exit the menu, press the F6 (EXIT) button once.
- To execute readjustment, press the F6 (EXIT) button once, then select the menu again.

(5) To save the adjustment data, perform the following steps (6) and (7) .

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(6) Press the F6 (EXIT) button again.

(7) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Superimposed display

```
SX RF ADJUST MODE
A107:A101-A106 ALL ADJUST

  Auto Adjust  (Push SET)
```

(1) ⇩ Insert SR 5-1/SR5-1P

(2) ⇩ F5(SET)

```
    SX RF ADJUST MODE  ☐
A107:A101-A106 ALL ADJUST
  A103:PLAY PLL
  Auto Adjusting

  ch  RSLT      ch  RSLT
  A1/5          B1/5
  A2/6          B2/6
*ALL
```

⇩

(omitted)

⇩

```
    SX RF ADJUST MODE  ☐
A107:A101-A106 ALL ADJUST
  A106:A/D GAIN
  Auto Adjusting

  ch  RSLT      ch  RSLT
  A1/5          B1/5
  A2/6          B2/6
*ALL
```

⇩

(omitted)

⇩

```
    SX RF ADJUST MODE  ☐
A107:A101-A106 ALL ADJUST
  A101:EQUALIZER
  Auto Adjusting

  ch  RSLT      ch  RSLT
  A1            B1
  A5            B5
  A2            B2
  A6            B6
*ALL
```

⇩

(omitted)

⇩

(continue)

(continued)

⇩

```
    SX RF ADJUST MODE  ☐
A107:A101-A106 ALL ADJUST
  A105:REV PLL
  Auto Adjusting

  ch   RSLT     ch   RSLT
  A1            B1
  A5            B5
  A2            B2
  A6            B6
*ALL
```

⇩

```
    SX RF ADJUST MODE
A107:A101-A106 ALL ADJUST

  Auto Adjust Complete
```

(3) ⇩ Check

(4) ⇩ F6(EXIT)

(5) ⇩

(6) ⇩ F6(EXIT)

(7) Data saving

```
*A1F:NV-RAM CONTROL
```

For Condition NG/Automatic Adjustment Failure

Recheck according to the procedures below when the massage "Condition NG" or "Auto Adjust Failure" is displayed in the adjustment menus A101 to A107.

(1) Confirm whether the specified alignment tape is used.
If the specified alignment tape is not used, execute the automatic adjustment by the specified one.
SR5-1 for 525 mode, SR5-1P for 625 mode
When no abnormality is found, the adjustment is completed.

(2) Clean the drum (video heads) according to the "For Condition NG (C100)" in Section 3-2-3.
This operation is not required when the drum has been already cleaned.

(3) When message "Condition NG" or "Auto Adjust Failure" is displayed during execution of menus other than menu A107 or A103, perform the menu A107.
When no abnormality is found, the adjustment is completed.

If the message "Condition NG" is still displayed, the possible causees below are considered.

- Servo system adjustment defect or circuit defect
  - ⇨ Readjust the servo system. (A00 : SERVO ADJUST)
  - ⇨ Check the servo system. (C01 : MOTOR)
- RF system adjustment defect
  - ⇨ Readjust the RF system. (A10 : SX RF ADJUST)
- Worn PB head in the drum assembly
  - ⇨ After checking the head projection (Section 9), replace the upper drum assembly or drum assembly as required.
- In the tape transport system adjustment defect or component part installation defect
  - ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect.
- Drum assembly defect

If the message "Auto Adjust Failure" is displayed, following causes also are considered.

- Brush/slip ring assembly defect or its part installation/ connection defect
  - ⇨ Replace or reinstall the brush/slip ring assembly.
- Harness (between the EQ-84 board and drum assembly) connection defect

A111 : EQUALIZER
A112 : REC CURRENT
A113 : PLAY PLL
A114 : FWD PLL
A115 : REV PLL
A116 : A/D GAIN

These menus are used to adjust the RF system of MPEG IMX format.

Notes

- For the HDW series, adjustments are required in the 59.94 Hz and 50 Hz modes.
- For the MSW series, adjustments are required in the 525 and 625 modes.

Note

The following display examples are those when the STOP buttom is being pressed.
Actually, “xx” is replaced with each adjustment data.

A111 : EQUALIZER

This menu automatically adjusts the PB RF levels (VC) and PB equalizer gain (EQ) and phase (PH) for the PB heads (channels AA, AB, AC, AD, NA, NB, NC, and ND).

Note

AA, AB, AC, and AD indicate Advance A, B, C, and D heads.
NA, NB, NC, and ND indicate Confidence A, B, C, and D heads.

```
    IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA           AB
 AC           AD
 NA           NB
 NC           ND
*ALL
```

```
    IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust  (Push SET)

ch VC FQ PH ch VC FQ PH
AA xx xx xx AB xx xx xx
AC xx xx xx AD xx xx xx
NA xx xx xx NB xx xx xx
NC xx xx xx ND xx xx xx
*ALL
```

A112 : REC CURRENT (MSW recorder only)

This menu automatically adjusts the recording current and frequency response for the REC heads (channels A, B, C, and D).

```
    IMX RF ADJUST MODE
A112:REC CURRENT

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 A            B
 C            D
*ALL
```

```
    IMX RF ADJUST MODE
A112:REC CURRENT

 Auto Adjust  (Push SET)

ch   I  EQ   ch   I  EQ
A   xx  xx   B   xx  xx
C   xx  xx   D   xx  xx
*ALL
```

A113 : PLAY PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for PLAY mode.

```
    IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

A114 : FWD PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for FWD mode.

```
    IMX RF ADJUST MODE
A114:FWD PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    IMX RF ADJUST MODE
A114:FWD PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

A115 : REV PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for REV mode.

```
    IMX RF ADJUST MODE
A115:REV PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    IMX RF ADJUST MODE
A115:REV PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

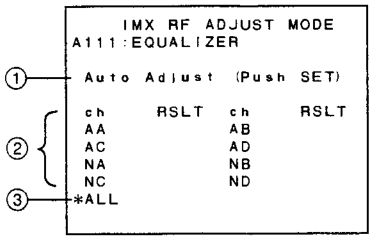
A116 : A/D GAIN

This menu automatically adjusts the gain in converting the PB RF signal from analog to digital.

```
    IMX RF ADJUST MODE
A116:A/D GAIN

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    IMX RF ADJUST MODE
A116:A/D GAIN

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

Description of superimposed display



```
        IMX RF ADJUST MODE
A111:EQUALIZER
 Auto Adjust (Push SET)

 ch     RSLT    ch      RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

Ex. A111 : EQUALIZER

① The display in this line changes. Each display and its meaning are described below.

Auto Adjust(Push SET) :	Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Tracking ... :	Tracking is in an optimization process.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.
Condition NG :	Error condition defect.
Insert Blank Tape :	Requesting to insert the tape on which recording is possible.
Insert MR5-1 :	Requesting to insert the alignment tape.

② To perform the automatic adjustment for single channel (circuit), select a channel name using an ∗ mark.
The adjustment result (OK, NG, or FAIL) will be displayed on the right of the channel name.

"OK" :	The channel could be adjusted normally.
"NG" :	The error condition of the channel was bad.
"FAIL" :	The automatic adjustment failed.

Note

"RSLT" indicates the result.

The adjustment data in each channel (circuit) is displayed while pressing the STOP button except in adjusting.

CAUTION

Do not press the STOP button in adjusting. If pressing it in adjusting, the tape stops and the automatic adjustment becomes impossible.

③ To perform the automatic adjustment for all channels (circuit) at a time, select "ALL" using the ∗ mark.
During the check, the adjustment result in each channel is displayed in area ②.
After the automatic adjustment in all channels is completed, the adjustment result (OK, NG, or FAIL) will be displayed on the right of "ALL".

"OK" :	All channels (circuits) were "OK".
"NG" :	Both "NG" and "OK" occurred in channels.
"FAIL" :	One or more "FAIL" occurred in channels.

To execute the adjustment

(1) Insert the specified cassette tape.

Notes

- If the specified cassette tape is not used, the adjustment cannot be properly performed even if the message "Auto Adjust Complete" is displayed on completing the adjustment. In A112 : REC CURRENT menu, insert the tape that can be recorded by MPEG IMX format. In other menus, insert alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode).
- In A112 : REC CURRENT menu, execute this menu under the REC INHIBIT indicator on the lower control panel is off. If this indicator lights, the cassette tape is automatically ejected.
  This indicator lights when the REC inhibit plug on the cassette tape is pushed in or when the REC INHIBIT switch on the subcontrol panel is set to ON.
- Take care that the tape transport mode does not change during automatic adjustment.
  Any adjustment cannot be properly performed in modes other than tape transport that was set automatically. Moreover, the automatic adjustment cannot be performed any longer or "FAIL" or "NG" is displayed as the adjustment result. Therefore, pay attention to the transport start position of the tape so that the end and beginning of the tape are not detected during adjustment. The minimum tape amount required for normal automatic adjustment is shown in the table on the next page. However, the tape amount increases or decreases when abnormality occurs.

Menu	Ordinary adjustment time	Tape amount required (Transport mode)
A111 : EQUALIZER Ⓣ	About 1 min./ALL, about 10 sec./channel	Adjustment time (PLAY)
A112 : REC CURRENT Ⓣ	About 30 sec./ALL, about 10 sec./channel	Adjustment time (REC)
A113 : PLAY PLL	About 15 sec./ALL, about 10 sec./circuit	Adjustment time (PLAY)
A114 : FWD PLL	About 10 sec.	About 10 min. (FWD)
A115 : REV PLL	About 10 sec.	About 11 min. (REV)
A116 : A/D GAIN Ⓣ	About 10 sec./ALL, about 5 sec./circuit	Adjustment time (PLAY)

In a menu with Ⓣ, tracking operation is performed.

(2) Turn the MULTI CONTROL knob to set the * mark to the channel to be adjusted or ALL.
- Usually, select ALL.

(3) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- During the automatic adjustment, the message "Auto Tracking ..." (only a menu in which tracking operation is performed) or "Auto Adjusting ..." will be displayed.

Note

When executing ALL adjustment in the menu in which tracking operation is carried out, the adjustment result of the channel is displayed every time one-channel (circuit) adjustment is completed.

- To cancel the automatic adjustment, press the F6 (EXIT) button once.
- When no cassette tape is inserted, the message "Insert MR5-1" or "Insert Blank Tape" will be displayed.
  In this case, insert the specified tape. The adjustment is then initiated after automatically running the tape.

Notes

- If the message "Auto Adjust (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be played back. Set the tape position to the beginning of recorded portion (not including A112 : REC CURRENT menu).
- Keep the unit until automatic adjustment is completed. Any adjustment cannot be properly performed if the tape transport state is changed by touching some button or search dial. In this case, the adjustment freezes or the adjustment result becomes "FAIL" or "NG".

(4) Check the result of automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" will be displayed on the right of the selected channel (circuit) or "ALL".
- If "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on page 3-85.
- To see the adjustment data, press the STOP button.

Note

"OK", "NG", or "FAIL" is also displayed in the menu display area.
The adjustment result for each channel (circuit) is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL adjustment.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the automatic adjustment again in this menu, go to step (2).

(6) To save the adjustment data, perform the following steps (7) and (8) .

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(7) Press the F6 (EXIT) button again.

(8) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Ex.: When ALL is selected
in A111 : EQUALIZER

```
    IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust  (Push SET)

 ch      RSLT  ch      RSLT
 AA            AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ MULTI CONTROL
(3) ⇩ F5(SET)

```
    IMX RF ADJUST MODE □
A111:EQUALIZER

 Auto Tracking ...

 ch      RSLT  ch      RSLT
 AA            AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

⇩

```
    IMX RF ADJUST MODE □
A111:EQUALIZER

 Auto Adjusting .......

 ch      RSLT  ch      RSLT
 AA            AB
 AC            AD
 NA            NB
 NB            ND
*ALL
```

⇩

```
    IMX RF ADJUST MODE □
A111:EQUALIZER

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 AA       OK   AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

⇩

(omitted)

⇩

```
    IMX RF ADJUST MODE
A111:EQUALIZER

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 AA       OK   AB       OK
 AC       OK   AC       OK
 NA       OK   NB       OK
 ND       OK   NC       OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩
(7) ⇩ F6(EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A112 : REC CURRENT

```
    IMX RF ADJUST MODE
A112:REC CURRENT

 Auto Adjust  (Push SET)

 ch      RSLT  ch      RSLT
 A             B
 C             D
*ALL
```

(1) ⇩ Insert a recording tape
(2) ⇩ MULTI CONTROL
(3) ⇩ F5(SET)

```
    IMX RF ADJUST MODE □
A112:REC CURRENT

 Auto Adjusting .......

 ch      RSLT  ch      RSLT
 A             B
 C             D
*ALL
```

⇩

```
    IMX RF ADJUST MODE □
A112:REC CURRENT

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 A        OK   B
 C             D
*ALL
```

⇩

```
    IMX RF ADJUST MODE □
A112:REC CURRENT

 Auto Adjusting .......

 ch   RSLT     ch      RSLT
 A     OK      B
 C             D
*ALL
```

⇩

(omitted)

⇩

```
    IMX RF ADJUST MODE
A112:REC CURRENT

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 A        OK   B        OK
 C        OK   D        OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩
(7) ⇩ F6(EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A113 : PLAY PLL

```
    IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust  (Push SET)

 ch      RSLT  ch      RSLT
 AA/AC         AB/AD
 NA/NC         NB/ND
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P
(2) ⇩ MULTI CONTROL
(3) ⇩ F5(SET)

```
    IMX RF ADJUST MODE □
A113:PLAY PLL

 Auto Adjusting .......

 ch      RSLT  ch      RSLT
 AA/AC         AB/AD
 NA/NC         NB/ND
*ALL
```

⇩

(omitted)

⇩

```
    IMX RF ADJUST MODE
A113:PLAY PLL

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 AA/AC    OK   AB/AD    OK
 NA/NC    OK   NB/ND    OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩
(7) ⇩ F6(EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

A117 : A111-A116 ALL ADJUST

This menu executes the automatic adjustment of A111 to A116 described previously in the following order.

A113 : PLAY PLL
A116 : A/D GAIN
A111 : EQUALIZER
A114 : FWD PLL
A115 : REV PLL
A112 : REC CURRENT

To execute the automatic adjustment

(1) Insert an alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode) rewound to the tape beginning.

Note

Be sure to use the specified alignment tape.
If the specified cassette tape is not used, the adjustment cannot be properly performed.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- The superimposed display during the automatic adjustment is displayed in the same way as when each adjustment is independently executed.
- The adjustment for a PB system is completed in about five to six minutes unless "Condition NG" or "Auto Adjust Failure" does not occur.
- On completing the adjustment for the PB system, a message "Set a blank tape and push SET button for REC CURRENT adjustment" is displayed on the superimposed display. The alignment tape stops with rewound to the tape beginning.

(3) Eject the alignment tape.
(4) Insert the cassette tape on which recording is possible.
(5) Press the F5 (SET) button.
- On pressing it, the automatic adjustment (A112 : REC CURRENT) in a REC system is initiated.
- The superimposed display during the automatic adjustment is displayed in the same way as when the adjustment is independently executed.
- The adjustment for the REC system is completed in several seconds unless "Condition NG" or "Auto Adjust Failure" does not occur.

(6) Check that the message "Auto Adjust Complete" is displayed on the superimposed display.
- When seeing the adjustment data, perform in each menu.

Note

If abnormality exists during adjustment, message "Condition NG" or "Auto Adjust Failure" is displayed in the same way as when the adjustment is executed independently.
The automatic adjustment stops in the adjustment menu.
- If the message "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on next page.
- To check the adjustment data, press the STOP button.

(7) To exit the menu, press the F6 (EXIT) button once.
- To execute readjustment, press the F6 (EXIT) button once, then select the menu again.

(8) To save the adjustment data, perform the following steps (9) and (10) .

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(9) Press the F6 (EXIT) button again.
(10)Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Superimposed display

```
      IMX RF ADJUST MODE
A117:A111-A116 ALL ADJUST

 Auto Adjust (Push SET)
```

(1) ⇩ Insert HR5-1A

(2) ⇩ F5 (SET)

```
      IMX RF ADJUST MODE ☐
A117:A111-A116 ALL ADJUST
 A113:PLAY PLL
 Auto Adjusting

 ch    RSLT   ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

⇩

(omitted)

⇩

```
      IMX RF ADJUST MODE ☐
A117:A111-A116 ALL ADJUST
 A116:A/D GAIN
 Auto Adjusting

 ch    RSLT   ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

⇩

(omitted)

⇩

```
      IMX RF ADJUST MODE ☐
A117:A111-A116 ALL ADJUST
 A111:EQUALIZER
 Auto Adjusting

 ch    RSLT   ch     RSLT
 AA           AB
 AC           AD
 NA           NB
 NC           ND
*ALL
```

⇩

(omitted)

⇩

(continue)

(continued)

⇩

```
      IMX RF ADJUST MODE ☐
A117:A111-A116 ALL ADJUST

 Set a blank tape and
 push SET button for
 REC CURRENT adjustment.
```

(3) ⇩ EJECT

(4) ⇩ Insert a recording tape

(5) ⇩ F5 (SET)

```
      IMX RF ADJUST MODE ☐
A117:A111-A116 ALL ADJUST
 A112:REC CURRENT
 Auto Adjusting

 ch   RSLT      ch   RSLT
 A              B
 C              D
*ALL
```

⇩

(omitted)

⇩

```
      IMX RF ADJUST MODE
A117:A111-A116 ALL ADJUST

 Auto Adjust Complete
```

(6) ⇩ Check

(7) ⇩ F6 (EXIT)

(8) ⇩

(9) ⇩ F6 (EXIT)

(10) Data saving

```
*A1F:NV-RAM CONTROL
```

For Condition NG/Automatic Adjustment Failure

Check according to the procedures below when the massage "Condition NG" or "Auto Adjust Failure" is displayed in the adjustment menus A111 to A117.

(1) Confirm whether the specified alignment tape is used. If the specified alignment tape is not used, execute the automatic adjustment by the specified one.
MR5-1 for 525 mode, MR5-1P for 625 mode
When no abnormality is found, the adjustment is completed.

(2) Clean the drum (video heads) according to the "For Condition NG (C110)" in "3-2-3. RF CHECK Mode (C1)".
This operation is not required when the drum has been already cleaned.

(3) When message "Condition NG" or "Auto Adjust Failure" is displayed during execution of menus other than menu A117 or A113, perform the menu A117.
When no abnormality is found, the adjustment is completed.

If the message "Condition NG" is still displayed, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system. (A00 : SERVO ADJUST)
  ⇨ Check the servo system. (C01 : MOTOR)
- RF system adjustment defect
  ⇨ Readjust the RF system. (A11 : IMX RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or drum assembly as required.
- In the tape transport system adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

If the message "Auto Adjust Failure" is displayed, the following causes also are considered.

- Brush/slip ring assembly defect or its part installation/connection defect
  ⇨ Replace or reinstall the brush/slip ring assembly.
- Harness (between the EQ-84 board and drum assembly) connection defect

A121 : EQUALIZER
A122 : REC CURRENT
A123 : PLAY PLL
A124 : FWD PLL
A125 : REV PLL
A126 : A/D GAIN

These menus are used to adjust the RF system of the Digital Betacam ormat automatically.

Notes

- For the HDW series, adjustments are required in the 59.94 Hz and 50 Hz modes.
- For the MSW series, adjustments are required in the 525 and 625 modes.

Note

The following display examples are those when the STOP buttom is being pressed.
Actually, "xx" is replaced with each adjustment data.

A121 : EQUALIZER

This menu automatically adjusts the PB RF levels (VC) and PB equalizer gain (EQ) and phase (PH) for the PB heads (channels AA, AB, AC, AD, NA, NB, NC and ND).

```
     DB RF ADJUST MODE
A121:EQUALIZER

  Auto Adjust  (Push SET)

  ch  RSLT     ch  RSLT
  AA           AB
  AC           AD
  NA           NB
  NC           ND
*ALL
```

```
     DB RF ADJUST MODE
A121:EQUALIZER

  Auto Adjust  (Push SET)

 ch VC EQ PH ch VC EQ PH
 AA xx xx xx AB xx xx xx
 AC xx xx xx AD xx xx xx
 NA xx xx xx NB xx xx xx
 NC xx xx xx ND xx xx xx
*ALL
```

A122 : REC CURRENT (for DVW recorder only)

This menu automatically adjusts the recording current and frequency response for the REC heads (channels A, B, C, and D).

```
     DB RF ADJUST MODE
A122:REC CURRENT

  Auto Adjust  (Push SET)

  ch     RSLT  ch     RSLT
  A            B
  C            D
*ALL
```

```
     DB RF ADJUST MODE
A122:REC CURRENT

  Auto Adjust  (Push SET)

 ch   I  EQ   ch   I  EQ
 A   xx xx    B   xx xx
 C   xx xx    D   xx xx
*ALL
```

A123 : PLAY PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for PLAY mode.

```
     DB RF ADJUST MODE
A123:PLAY PLL

  Auto Adjust  (Push SET)

  ch     RSLT  ch     RSLT
  AA/AC        AB/AD
  NA/NC        NB/ND
*ALL
```

```
     DB RF ADJUST MODE
A123:PLAY PLL

  Auto Adjust  (Push SET)

  ch      VR    ch      VR
  AA/AC xx      AB/AD xx
  NA/NC xx      NB/ND xx
*ALL
```

A124 : FWD PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for FWD mode.

```
     DB RF ADJUST MODE
A124:FWD PLL

  Auto Adjust  (Push SET)

  ch     RSLT  ch     RSLT
  AA/AC        AB/AD
  NA/NC        NB/ND
*ALL
```

```
     DB RF ADJUST MODE
A124:FWD PLL

  Auto Adjust  (Push SET)

  ch      VR    ch      VR
  AA/AC xx      AB/AD xx
  NA/NC xx      NB/ND xx
*ALL
```

A125 : REV PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for REV mode.

```
     DB RF ADJUST MODE
A125:REV PLL

  Auto Adjust  (Push SET)

  ch     RSLT  ch     RSLT
  AA/AC        AB/AD
  NA/NC        NB/ND
*ALL
```

```
     DB RF ADJUST MODE
A125:REV PLL

  Auto Adjust  (Push SET)

  ch      VR    ch      VR
  AA/AC xx      AB/AD xx
  NA/NC xx      NB/ND xx
*ALL
```

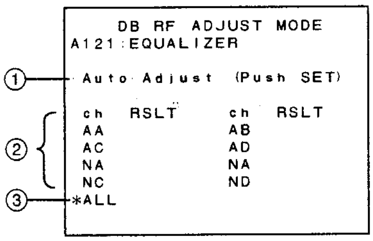
A126 : A/D GAIN

This menu automatically adjusts the gain in converting the PB RF signal from analog to digital.

```
     DB RF ADJUST MODE
A126:A/D GAIN

  Auto Adjust  (Push SET)

  ch     RSLT  ch     RSLT
  AA/AC        AB/AD
  NA/NC        NB/ND
*ALL
```

```
     DB RF ADJUST MODE
A126:A/D GAIN

  Auto Adjust  (Push SET)

  ch      VR    ch      VR
  AA/AC xx      AB/AD xx
  NA/NC xx      NB/ND xx
*ALL
```

Description of superimposed display



```
      DB RF ADJUST MODE
A121 :EQUALIZER
 Auto Adjust  (Push SET)
 ch   RSLT      ch   RSLT
 AA             AB
 AC             AD
 NA             NA
 NC             ND
*ALL
```

Ex. A121 : EQUALIZER

① The display in this line changes. Each display and its meaning are described below.

Auto Adjust(Push SET) : Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Tracking ... : Tracking is in an optimization process.
Auto Adjusting ... : Automatic adjustment is in progress.
Auto Adjust Complete : Automatic adjustment was completed.
Auto Adjust Failure : Automatic adjustment failed.
Condition NG : Error condition defect.
Insert ZR5-1 : Requesting to insert the specified alignment tape

② To perform the automatic adjustment for single channel (circuit), select a channel name using an ∗ mark. The adjustment result (OK, NG, or FAIL) will be displayed on the right of the channel name.

"OK" : The channel was adjusted normally.
"NG" : The error condition of the channel was bad.
"FAIL" : The automatic adjustment failed.

Note

"RSLT" indicates the result.

The adjustment data in each channel (circuit) is displayed while pressing the STOP button except in adjusting.

CAUTION

Do not press the STOP button in adjusting. If pressing it in adjusting, the tape stops and the automatic adjustment becomes impossible.

③ To perform the automatic adjustment for all channels (circuit) at a time, select "ALL" using the ∗ mark. During the check, the adjustment result in each channel is displayed in area ②. After the automatic adjustment in all channels is completed, the adjustment result (OK, NG, or FAIL) will be displayed on the right of "ALL".

"OK" : All channels (circuits) were "OK".
"NG" : Both "NG" and "OK" occurred in channels.
"FAIL" : One or more "FAIL" occurred in channels.

To execute the adjustment

(1) Insert the cassette tape specified in ①: ZR5-1 (for 525 mode) or ZR5-1P (for 625 mode)

Notes

- Be sure to use the specified alignment tape. If the specified cassette tape is not used, the adjustment cannot be properly performed even if the message "Auto Adjust Complete" is displayed on completing the adjustment.
- Take care that the tape transport mode does not change during automatic adjustment. Any adjustment cannot be properly performed in modes other than the tape transport mode that was set automatically. Moreover, in modes other than the tape transport mode, the automatic adjustment cannot be performed any longer or "FAIL" or "NG" is displayed as the adjustment result. Therefore, pay attention to the transport start position of the tape so that the end and beginning of the tape are not detected during adjustment. The minimum tape amount required for normal automatic adjustment is shown in the table on the next page. However, the tape amount increases or decreases when abnormality occurs.

Menu	Ordinary adjustment time	Tape amount required (Transport mode)
A121 : EQUALIZER Ⓣ	About 30 sec./ALL, about 5 sec./channel	Adjustment time (PLAY)
A122 : REC CURRENT Ⓣ	About 30 sec./ALL, about 10 sec./channel	Adjustment time (REC)
A123 : PLAY PLL	About 15 sec./ALL, about 5 sec./circuit	Adjustment time (PLAY)
A124 : FWD PLL	About 10 sec.	About 10 min. (FWD)
A125 : REV PLL	About 10 sec.	About 11 min. (REV)
A126 : A/D GAIN Ⓣ	About 10 sec./ALL, about 5 sec./circuit	Adjustment time (PLAY)

In a menu with Ⓣ, tracking operation is performed.

(2) Turn the MULTI CONTROL knob to set the * mark to the channel to be adjusted or ALL. Usually, select ALL.

(3) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- During the automatic adjustment, the message "Auto Tracking ..." (only a menu in which tracking operation is performed) or "Auto Checking ..." will be displayed.

  Note

  When executing ALL adjustment in the menu in which tracking operation is carried out, the adjustment result of the channel is displayed every time one-channel (circuit) adjustment is completed.
- To cancel the automatic adjustment, press the F6 (EXIT) button once.
- When no cassette tape is inserted, the message "Insert ZR5-1" will be displayed.

  In this case, insert the specified tape. The adjustment is then initiated after automatically running the tape.

Notes
- If the message "Auto Adjust (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be played back. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic adjustment is completed. Any adjustment cannot be properly performed if the tape transport state is changed by touching some button or search dial. In this case, the adjustment freezes or the adjustment result becomes "FAIL" or "NG".

(4) Check to see the result of automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" will be displayed on the right of the selected channel (circuit) or "ALL".
- If "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on page 3-91.
- To see the adjustment data, press the STOP button.

Note

"OK", "NG", or "FAIL" is also displayed in the menu display area.

The adjustment result for each channel (circuit) is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL adjustment.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the automatic adjustment again in this menu, go to step (2).

(6) To save the adjustment data, press the F6 (EXIT) button again.

(7) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A1F : NV-RAM CONTROL menu.

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

Example of display and operation

Ex.: When ALL is selected
in A121 : EQUALIZER

```
    DB RF ADJUST MODE
A121:EQUALIZER

 Auto Adjust  (Push SET)

 ch  RSLT      ch  RSLT
 AA            AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

(1) ⇩ Insert ZR5-1/ZR5-1P
(2) ⇩ Select
(3) ⇩ F5(SET)

```
    DB RF ADJUST MODE  □
A121:EQUALIZER

 Auto Tracking ...

 ch  RSLT      ch  RSLT
 AA            AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

⇩

```
    DB RF ADJUST MODE  □
A121:EQUALIZER

 Auto Adjusting .......

 ch  RSLT      ch  RSLT
 AA            AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

⇩

```
    DB RF ADJUST MODE  □
A121:EQUALIZER

 Auto Adjust Complete

 ch  RSLT      ch  RSLT
 AA   OK       AB
 AC            AD
 NA            NB
 NC            ND
*ALL
```

⇩
(omitted)
⇩

```
    DB RF ADJUST MODE
A121:EQUALIZER

 Auto Adjust Complete

 ch  RSLT      ch  RSLT
 AA   OK       AB   OK
 AC   OK       AD   OK
 NA   OK       NB   OK
 NC   OK       ND   OK
*ALL  OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩ F6(EXIT)
(7) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A122 : REC CURRENT

```
    DB RF ADJUST MODE
A122:REC CURRENT

 Auto Adjust  (Push SET)

 ch      RSLT  ch      RSLT
 A             B
 C             D
*ALL
```

(1) ⇩ Insert a recording tape
(2) ⇩ MULTI CONTROL
(3) ⇩ F5(SET)

```
    DB RF ADJUST MODE  □
A122:REC CURRENT

 Auto Adjusting .......

 ch      RSLT  ch      RSLT
 A             B
 C             D
*ALL
```

⇩

```
    DB RF ADJUST MODE  □
A122:REC CURRENT

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 A        OK   B
 C             D
*ALL
```

⇩

```
    DB RF ADJUST MODE  □
A122:REC CURRENT

 Auto Adjusting .......

 ch   RSLT      ch     RSLT
 A     OK       B
 C              D
*ALL
```

⇩
(omitted)
⇩

```
    DB RF ADJUST MODE
A122:REC CURRENT

 Auto Adjust Complete

 ch      RSLT  ch      RSLT
 A        OK   B        OK
 C        OK   D        OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩
(7) ⇩ F6(EXIT)
(8) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A123 : PLAY PLL

```
    DB RF ADJUST MODE
A123:PLAY PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

(1) ⇩ Insert ZR5-1/ZR5-1P
(2) ⇩ Select
(3) ⇩ F5(SET)

```
    DB RF ADJUST MODE  □
A123:PLAY PLL

 Auto Adjusting

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

⇩
(omitted)
⇩

```
    DB RF ADJUST MODE
A123:PLAY PLL

 Auto Adjust Complete

 ch     RSLT  ch     RSLT
 AA/AC  OK    AB/AD  OK
 NA/NC  OK    NB/ND  OK
*ALL    OK
```

(4) ⇩ Check
(5) ⇩ F6(EXIT)
(6) ⇩ F6(EXIT)
(7) Data saving

```
*A1F:NV-RAM CONTROL
```

A127 : A121-A126 ALL ADJUST

This menu executes the automatic adjustment of A101 to A106 described previously in the following order.

A123 : PLAY PLL
A126 : A/D GAIN
A121 : EQUALIZER
A124 : FWD PLL
A125 : REV PLL
S122 : REC CURRENT

To execute the automatic adjustment

(1) Insert an alignment tape ZR5-1 (for 525 mode) or ZR5-1P (for 625 mode) rewound to the tape beginning.

Note

Be sure to use the specified alignment tape.
If the specified cassette tape is not used, the adjustment cannot be properly performed.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- The superimposed display during the automatic adjustment is displayed in the same way as when each adjustment is independently executed.
- The adjustment is completed in about five to six minutes unless "Condition NG" or "Auto Adjust Failure" does not occur.
- On completing the adjustment, the alignment tape stops with rewound to the tape beginning.

(3) Check to see that the message "Auto Adjust Complete" is displayed on the superimposed display. When seeing the adjustment data, perform in each menu.

Note

If abnormality exists during adjustment, message "Condition NG" or "Auto Adjust Failure" is displayed in the same way as when the adjustment is executed independently. The automatic adjustment stops in the adjustment menu. In the menu display area, a message "A127-ALL FAIL" or "A127-ALL NG" is displayed.
- If the message "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on next page.
- To check the adjustment data, press the STOP button.

(4) To exit the menu, press the F6 (EXIT) button once.
- To execute readjustment, press the F6 (EXIT) button once, then select the menu again.

(5) To save the adjustment data, press the F6 (EXIT) button again.

(6) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A1F : NV-RAM CONTROL menu.

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (when the message "Auto Adjust Failure" or "Condition NG" is displayed).

Example of display and operation

Superimposed display

```
    DB RF ADJUST MODE
A127:A121-A126 ALL ADJUST

  Auto Adjust  (Push SET)
```

(1) ⇩ Insert ZR 5-1/ZR5-1P

(2) ⇩ F5(SET)

```
    DB RF ADJUST MODE  □
A127:A121-A126 ALL ADJUST
  A123:PLAY PLL
  Auto Adjusting

  ch    RSLT  ch    RSLT
  AA/AC       AB/AD
  NA/NC       NB/ND
*ALL
```

⇩

(omitted)

⇩

```
    DB RF ADJUST MODE  □
A127:A121-A126 ALL ADJUST
  A126:A/D GAIN
  Auto Adjusting

  ch    RSLT  ch    RSLT
  AA/AC       AB/AD
  NA/NC       NB/ND
*ALL
```

⇩

(omitted)

⇩

```
    DB RF ADJUST MODE  □
A127:A121-A126 ALL ADJUST
  A121:EQUALIZER
  Auto Adjusting

  ch   RSLT    ch   RSLT
  AA           AB
  AC           AD
  NA           NB
  NC           ND
*ALL
```

⇩

(omitted)

⇩

(continue)

(continued)

⇩

```
    DB RF ADJUST MODE  □
A127:A121-A126 ALL ADJUST
  A125:REV PLL
  Auto Adjusting

  ch   RSLT     ch   RSLT
  AA            AB
  AC            AD
  NA            NB
  NC            ND
*ALL
```

⇩

```
    DB RF ADJUST MODE
A127:A121-A126 ALL ADJUST

  Auto Adjust Complete
```

(3) ⇩ Check

(4) ⇩ F6(EXIT)

(5) ⇩ F6(EXIT)

(6) Data saving

```
*A1F:NV-RAM CONTROL
```

For Condition NG/Automatic Adjustment Failure

Recheck according to the procedures below when the massage "Condition NG" or "Auto Adjust Failure" is displayed in the adjustment menus A121 to A127.

(1) Confirm whether the specified alignment tape is used.
If the specified alignment tape is not used, execute the automatic adjustment by the specified one.
ZR5-1 for 525 mode, ZR5-1P for 625 mode
When no abnormality is found, the adjustment is completed.

(2) Clean the drum (video heads) according to the "For Condition NG (C120)" in Section 3-2-3.
This operation is not required when the drum has been already cleaned.

(3) When message "Condition NG" or "Auto Adjust Failure" is displayed during execution of menus other than menu A127 or A123, perform the menu A127.
When no abnormality is found, the adjustment is completed.

If the message "Condition NG" is still displayed, the possible causees below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system. (A00 : SERVO ADJUST)
  ⇨ Check the servo system. (C01 : MOTOR)
- RF system adjustment defect
  ⇨ Readjust the RF system. (A12 : DB RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or drum assembly as required.
- In the tape transport system adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect.
- Drum assembly defect

If the message "Auto Adjust Failure" is displayed, following causes also are considered.

- Brush/slip ring assembly defect or its part installation/connection defect
  ⇨ Replace or reinstall the brush/slip ring assembly.
- Harness (between the EQ-84 board and drum assembly) connection defect

A131 : EQUALIZER
A132 : REC CURRENT
A133 : PLAY PLL
A134 : FWD PLL
A135 : REV PLL
A136 : A/D GAIN

These menus are used to adjust the RF system of HDCAM format.

Note

Adjustments are required in the 59.94 Hz, 50 Hz, and 24 Hz mode.

Notes

- The following display examples are those when the Stop button is being pressed.
- AA, AB, AC, and AD indicate Advance A, B, C, and D heads.
  NA, NB, NC, and ND indicate Confidence A, B, C, and D heads.

A131 : EQUALIZER

This menu automatically adjusts the PB RF levels (VC) and PB equalizer gain (EQ) and phase (PH) for the PB heads (channels AA, AB, AC, AD, NA, NB, NC, and ND).

```
    HD RF ADJUST MODE
A131:EQUALIZER

 Auto Adjust  (Push SET)

 ch    RSLT  ch    RSLT
 AA          AB
 AC          AD
 NA          NB
 NC          ND
*ALL
```

```
    HD RF ADJUST MODE
A131:EQUALIZER

 Auto Adjust  (Push SET)

 ch VC FQ PH ch VC FQ PH
 AA xx xx xx AB xx xx xx
 AC xx xx xx AD xx xx xx
 NA xx xx xx NB xx xx xx
 NC xx xx xx ND xx xx xx
*ALL
```

A132 : REC CURRENT

This menu automatically adjusts the recording current and frequency response for the REC heads (channels A, B, C, and D) and duty ratio of REC CK.

```
    HD RF ADJUST MODE
A132:REC CURRENT

 Auto Adjust  (Push SET)

 ch    RSLT  ch    RSLT
 A           B
 C           D
 CLK        *ALL
```

```
    HD RF ADJUST MODE
A132:REC CURRENT

 Auto Adjust  (Push SET)

 ch  I  EQ    ch  I  EQ
 A   xx xx    B   xx xx
 C   xx xx    D   xx xx
 CLK         *ALL
```

A133 : PLAY PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for PLAY mode.

```
    HD RF ADJUST MODE
A133:PLAY PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    HD RF ADJUST MODE
A133:PLAY PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

A134 : FWD PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for FWD mode.

```
    HD RF ADJUST MODE
A134:FWD PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    HD RF ADJUST MODE
A134:FWD PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

A135 : REV PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for REV mode.

```
    HD RF ADJUST MODE
A135:REV PLL

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    HD RF ADJUST MODE
A135:REV PLL

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

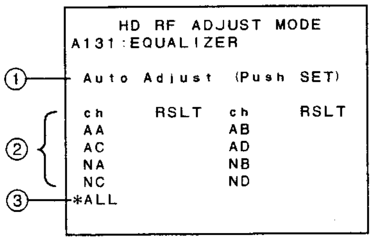
A136 : A/D GAIN

This menu automatically adjusts the gain in converting the PB RF signal from analog to digital.

```
    HD RF ADJUST MODE
A136:A/D GAIN

 Auto Adjust  (Push SET)

 ch     RSLT  ch     RSLT
 AA/AC        AB/AD
 NA/NC        NB/ND
*ALL
```

```
    HD RF ADJUST MODE
A136:A/D GAIN

 Auto Adjust  (Push SET)

 ch     VR    ch     VR
 AA/AC  xx    AB/AD  xx
 NA/NC  xx    NB/ND  xx
*ALL
```

Description of superimposed display



```
HD RF ADJUST MODE
A131 :EQUALIZER
Auto Adjust  (Push SET)
ch    RSLT   ch    RSLT
AA           AB
AC           AD
NA           NB
NC           ND
*ALL
```

Ex. A131 : EQUALIZER

① The display in this line changes. Each display and its meaning are described below.

Auto Adjust(Push SET) :	Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Tracking ... :	Tracking is in an optimization process.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.
Condition NG :	Error condition defect.
Insert Blank Tape :	Requesting to insert the tape on which recording is possible.
Insert HR5-1A :	Requesting to insert the alignment tape.

② To perform the automatic adjustment for single channel (circuit), select a channel name using an * mark.
The adjustment result (OK, NG, or FAIL) will be displayed on the right of the channel name.

"OK" : The channel could be adjusted normally.
"NG" : The error condition of the channel was bad.
"FAIL" : The automatic adjustment failed.

Note

"RSLT" indicates the result.

The adjustment data in each channel (circuit) is displayed while pressing the STOP button except in adjusting.

CAUTION

Do not press the STOP button in adjusting. If pressing it in adjusting, the tape stops and the automatic adjustment becomes impossible.

③ To perform the automatic adjustment for all channels (circuit) at a time, select "ALL" using the * mark.
During the check, the adjustment result in each channel is displayed in area ②.
After the automatic adjustment in all channels is completed, the adjustment result (OK, NG, or FAIL) will be displayed on the right of "ALL".

"OK" : All channels (circuits) were "OK".
"NG" : Both "NG" and "OK" occurred in channels.
"FAIL" : One or more "FAIL" occurred in channels.

To execute the adjustment

(1) Insert the specified cassette tape.

Notes

- If the specified cassette tape is not used, the adjustment cannot be properly performed even if the message "Auto Adjust Complete" is displayed on completing the adjustment. In A132 : REC CURRENT menu, insert the tape that can be recorded by HDCAM format. In other menus, insert alignment tape HR5-1A .
- In A132 : REC CURRENT menu, execute this menu under the REC INHIBIT indicator on the lower control panel is off. If this indicator lights, the cassette tape is automatically ejected.
  This indicator lights when the REC inhibit plug on the cassette tape is pushed in or when the REC INHIBIT switch on the subcontrol panel is set to ON.
- Take care that the tape transport mode does not change during automatic adjustment.
  Any adjustment cannot be properly performed in modes other than tape transport that was set automatically. Moreover, the automatic adjustment cannot be performed any longer or "FAIL" or "NG" is displayed as the adjustment result. Therefore, pay attention to the transport start position of the tape so that the end and beginning of the tape are not detected during adjustment. The minimum tape amount required for normal automatic adjustment is shown in the table on the next page. However, the tape amount increases or decreases when abnormality occurs.

Menu	Ordinary adjustment time	Tape amount required (Transport mode)
A131 : EQUALIZER Ⓣ	About 1 min./ALL, about 5 sec./channel	Adjustment time (PLAY)
A132 : REC CURRENT Ⓣ	About 90 sec./ALL, about 10 sec./channel	Adjustment time (REC)
A133 : PLAY PLL	About 12 sec./ALL, about 10 sec./circuit	Adjustment time (PLAY)
A134 : FWD PLL	About 10 sec.	About 10 min. (FWD)
A135 : REV PLL	About 10 sec.	About 11 min. (REV)
A136 : A/D GAIN Ⓣ	About 10 sec./ALL, about 5 sec./circuit	Adjustment time (PLAY)

In a menu with Ⓣ, tracking operation is performed.

(2) Turn the MULTI CONTROL knob to set the ∗ mark to the channel to be adjusted or ALL.
- Usually, select ALL.

(3) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- During the automatic adjustment, the message "Auto Tracking ..." (only a menu in which tracking operation is performed) or "Auto Adjusting ..." will be displayed.

  Note

  When executing ALL adjustment in the menu in which tracking operation is carried out, the adjustment result of the channel is displayed every time one-channel (circuit) adjustment is completed.
- To cancel the automatic adjustment, press the F6 (EXIT) button once.
- When no cassette tape is inserted, the message "Insert HR5-1A" or "Insert Blank Tape" will be displayed.

  In this case, insert the specified tape. The adjustment is then initiated after automatically running the tape.

Notes

- If the message "Auto Adjust (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be played back. Set the tape position to the beginning of recorded portion (not including A132 : REC CURRENT menu).
- Keep the unit until automatic adjustment is completed. Any adjustment cannot be properly performed if the tape transport state is changed by touching some button or search dial. In this case, the adjustment freezes or the adjustment result becomes "FAIL" or "NG".

(4) Check the result of automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" will be displayed on the right of the selected channel (circuit) or "ALL".
- If "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on page 3-103.
- To see the adjustment data, press the STOP button.

  Note

  "OK", "NG", or "FAIL" is also displayed in the menu display area.

  The adjustment result for each channel (circuit) is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL adjustment.

(5) To exit the menu, press the F6 (EXIT) button once. To execute the automatic adjustment again in this menu, go to step (2).

(6) To save the adjustment data, press the F6 (EXIT) button again.

(7) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.

To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A1F : NV-RAM CONTROL menu.

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

Example of display and operation

Ex.: When ALL is selected
in A131 : EQUALIZER

```
   HD RF ADJUST MODE
A131:EQUALIZER

 Auto Adjust  (Push SET)

 ch      RSLT   ch      RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

(1) ⇩ Insert HR5-1A
(2) ⇩ MULTI CONTROL
(3) ⇩ F5 (SET)

```
   HD RF ADJUST MODE  ☐
A131:EQUALIZER

 Auto Tracking ...

 ch      RSLT   ch      RSLT
 AA             AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

⇩

```
   HD RF ADJUST MODE  ☐
A131:EQUALIZER

 Auto Adjusting .......

 ch      RSLT   ch      RSLT
 AA             AB
 AC             AD
 NA             NB
 NB             ND
*ALL
```

⇩

```
   HD RF ADJUST MODE  ☐
A131:EQUALIZER

 Auto Adjust Complete

 ch      RSLT   ch      RSLT
 AA       OK    AB
 AC             AD
 NA             NB
 NC             ND
*ALL
```

⇩
(omitted)
⇩

```
   HD RF ADJUST MODE
A131:EQUALIZER

 Auto Adjust Complete

 ch      RSLT   ch      RSLT
 AA       OK    AB       OK
 AC       OK    AC       OK
 NA       OK    NB       OK
 ND       OK    NC       OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)
(6) ⇩ F6 (EXIT)
(7) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A132 : REC CURRENT

```
   HD RF ADJUST MODE
A132:REC CURRENT

 Auto Adjust  (Push SET)

 ch      RSLT   ch      RSLT
 A              B
 C              D
 CLK           *ALL
```

(1) ⇩ Insert a recording tape
(2) ⇩ MULTI CONTROL
(3) ⇩ F5 (SET)

```
   HD RF ADJUST MODE  ☐
A132:REC CURRENT

 Auto Adjusting .......

 ch      RSLT   ch      RSLT
 A              B
 C              D
 CLK           *ALL
```

⇩

```
   HD RF ADJUST MODE  ☐
A132:REC CURRENT

 Auto Adjust Complete

 ch      RSLT   ch      RSLT
 A        OK    B
 C              D
 CLK           *ALL
```

⇩

```
   HD RF ADJUST MODE  ☐
A132:REC CURRENT

 Auto Adjusting .......

 ch   RSLT      ch      RSLT
 A     OK       B
 C              D
 CLK           *ALL
```

⇩
(omitted)
⇩

```
   HD RF ADJUST MODE
A132:REC CURRENT

 Auto Adjust Complete

 ch      RSLT   ch      RSLT
 A        OK    B        OK
 C        OK    D        OK
 CLK      OK   *ALL
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)
(6) ⇩ F6 (EXIT)
(7) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A133 : PLAY PLL

```
   HD RF ADJUST MODE
A133:PLAY PLL

 Auto Adjust  (Push SET)

 ch      RSLT   ch      RSLT
 AA/AC          AB/AD
 NA/NC          NB/ND
*ALL
```

(1) ⇩ Insert HR5-1A
(2) ⇩ MULTI CONTROL
(3) ⇩ F5 (SET)

```
   HD RF ADJUST MODE  ☐
A133:PLAY PLL

 Auto Adjusting

 ch      RSLT   ch      RSLT
 AA/AC          AB/AD
 NA/NC          NB/ND
*ALL
```

⇩
(omitted)
⇩

```
   HD RF ADJUST MODE
A133:PLAY PLL

 Auto Adjust Complete

 ch      RSLT   ch      RSLT
 AA/AC    OK    AB/AD    OK
 NA/NC    OK    NB/ND    OK
*ALL      OK
```

(4) ⇩ Check
(5) ⇩ F6 (EXIT)
(6) ⇩ F6 (EXIT)
(7) Data saving

```
*A1F:NV-RAM CONTROL
```

A137 : A131-A136 ALL ADJUST

This menu executes the automatic adjustment of A131 to A136 described previously in the following order.

A133 : PLAY PLL
A136 : A/D GAIN
A131 : EQUALIZER
A134 : FWD PLL
A135 : REV PLL
A132 : REC CURRENT

To execute the automatic adjustment

(1) Insert an alignment tape HR5-1A rewound to the tape beginning.

Note

Be sure to use the specified alignment tape.
If the specified cassette tape is not used, the adjustment cannot be properly performed.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- The superimposed display during the automatic adjustment is displayed in the same way as when each adjustment is independently executed.
- The adjustment for a PB system is completed in about five to six minutes unless "Condition NG" or "Auto Adjust Failure" does not occur.
- On completing the adjustment for the PB system, a message "Set a blank tape and push SET button for REC CURRENT adjustment" is displayed on the superimposed display. The alignment tape stops with rewound to the tape beginning.

(3) Eject the alignment tape.
(4) Insert the cassette tape on which recording is possible.
(5) Press the F5 (SET) button.
- On pressing it, the automatic adjustment (A132 : REC CURRENT) in a REC system is initiated.
- The superimposed display during the automatic adjustment is displayed in the same way as when the adjustment is independently executed.
- The adjustment for the REC system is completed in several seconds unless "Condition NG" or "Auto Adjust Failure" does not occur.

(6) Check that the message "Auto Adjust Complete" is displayed on the superimposed display.
- When seeing the adjustment data, perform in each menu.

Note

If abnormality exists during adjustment, message "Condition NG" or "Auto Adjust Failure" is displayed in the same way as when the adjustment is executed independently.
The automatic adjustment stops in the adjustment menu.
- If the message "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on next page.
- To check the adjustment data, press the STOP button.

(7) To exit the menu, press the F6 (EXIT) button once.
- To execute readjustment, press the F6 (EXIT) button once, then select the menu again.

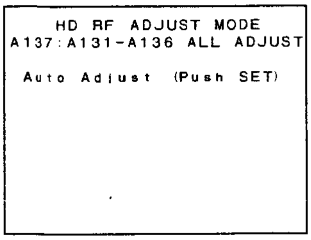
(8) To save the adjustment data, press the F6 (EXIT) button again.
(9) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A1F : NV-RAM CONTROL menu.

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (when the message "Auto Adjust Failure" or "Condition NG" is displayed).

Example of display and operation

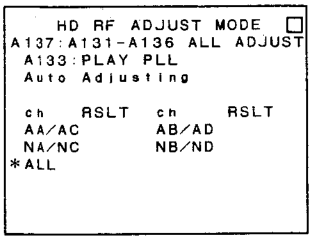
Superimposed display



```
    HD RF ADJUST MODE
A137:A131-A136 ALL ADJUST

 Auto Adjust  (Push SET)
```

(1) ⇩ Insert HR5-1A

(2) ⇩ F5 (SET)

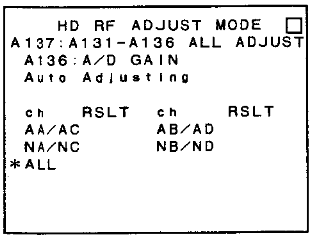


```
    HD RF ADJUST MODE  ☐
A137:A131-A136 ALL ADJUST
 A133:PLAY PLL
 Auto Adjusting

 ch   RSLT  ch     RSLT
 AA/AC      AB/AD
 NA/NC      NB/ND
*ALL
```

⇩

(omitted)

⇩

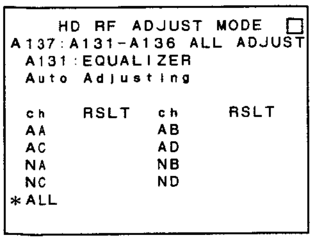


```
    HD RF ADJUST MODE  ☐
A137:A131-A136 ALL ADJUST
 A136:A/D GAIN
 Auto Adjusting

 ch   RSLT  ch     RSLT
 AA/AC      AB/AD
 NA/NC      NB/ND
*ALL
```

⇩

(omitted)

⇩



```
    HD RF ADJUST MODE  ☐
A137:A131-A136 ALL ADJUST
 A131:EQUALIZER
 Auto Adjusting

 ch   RSLT  ch     RSLT
 AA         AB
 AC         AD
 NA         NB
 NC         ND
*ALL
```

⇩

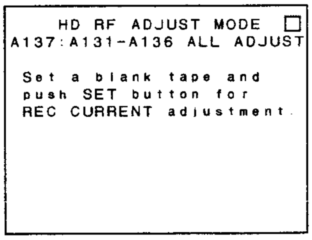
(omitted)

⇩

(continue)

(continued)

⇩

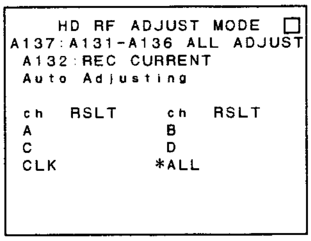


```
    HD RF ADJUST MODE  ☐
A137:A131-A136 ALL ADJUST

 Set a blank tape and
 push SET button for
 REC CURRENT adjustment.
```

(3) ⇩ EJECT

(4) ⇩ Insert a recording tape

(5) ⇩ F5 (SET)

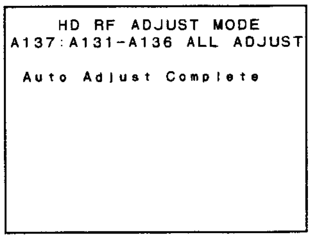


```
    HD RF ADJUST MODE  ☐
A137:A131-A136 ALL ADJUST
 A132:REC CURRENT
 Auto Adjusting

 ch  RSLT      ch  RSLT
 A             B
 C             D
 CLK          *ALL
```

⇩

(omitted)

⇩



```
    HD RF ADJUST MODE
A137:A131-A136 ALL ADJUST

 Auto Adjust Complete
```

(6) ⇩ Check

(7) ⇩ F6 (EXIT)

(8) ⇩ F6 (EXIT)

(9) Data saving

```
*A1F:NV-RAM CONTROL
```

For Condition NG/Automatic Adjustment Failure

Check according to the procedures below when the massage "Condition NG" or "Auto Adjust Failure" is displayed in the adjustment menus A131 to A137.

(1) Confirm whether the specified alignment tape is used. If the specified alignment tape is not used, execute the automatic adjustment by the specified one (HR5-1A). When no abnormality is found, the adjustment is completed.

(2) Clean the drum (video heads) according to the "For Condition NG (C130)" in "3-2-3. RF CHECK Mode (C1)". This operation is not required when the drum has been already cleaned.

(3) When message "Condition NG" or "Auto Adjust Failure" is displayed during execution of menus other than menu A137 or A133, perform the menu A137. When no abnormality is found, the adjustment is completed.

If the message "Condition NG" is still displayed, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system. (A00 : SERVO ADJUST)
  ⇨ Check the servo system. (C01 : MOTOR)
- RF system adjustment defect
  ⇨ Readjust the RF system. (A13 : HD RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or drum assembly as required.
- In the tape transport system adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

If the message "Auto Adjust Failure" is displayed, the following causes also are considered.

- Brush/slip ring assembly defect or its part installation/ connection defect
  ⇨ Replace or reinstall the brush/slip ring assembly.
- Harness (between the EQ-84 board and drum assembly) connection defect

A141 : EQUALIZER
A143 : PLAY PLL
A146 : A/D GAIN

These menus are used to adjust the RF system of MPEG IMX format ×2 playback.

Note

Displays are examples while pressing the STOP button. Actually, each adjustment data is displayed at the "xx" portion.

A141 : EQUALIZER

This menu automatically adjusts the PB RF levels (VC) and PB equalizer gain (EQ) and phase (PH) for the PB heads (channels NA, NB, NC, and ND).

Note

NA, NB, NC and ND indicate Confidence A, B, C and D heads.

```
      x2 RF ADJUST MODE
A141:EQUALIZER

  Auto Adjust (Push SET)

  ch     RSLT  ch     RSLT
  NA           NB
  NC           ND
*ALL
```

```
      x2 RF ADJUST MODE
A141:EQUALIZER

  Auto Adjust (Push SET)

  ch VC FQ PH ch VC FQ PH
  NA xx xx xx NB xx xx xx
  NC xx xx xx ND xx xx xx
*ALL
```

A143 : PLAY PLL

This menu automatically adjusts the VCO free-running frequency in the PB PLL circuit for PLAY mode.

```
      x2 RF ADJUST MODE
A143:PLAY PLL

  Auto Adjust (Push SET)

  ch     RSLT  ch     RSLT
  NA/NC        NB/ND
*ALL
```

```
      x2 RF ADJUST MODE
A143:PLAY PLL

  Auto Adjust (Push SET)

  ch     VR    ch     VR
  NA/NC  xx    NB/ND  xx
*ALL
```

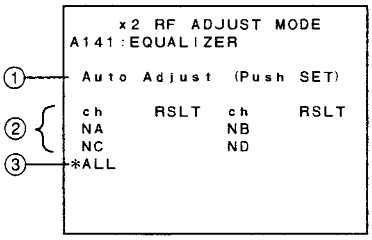
A146 : A/D GAIN

This menu automatically adjusts the gain in converting the PB RF signal from analog to digital.

```
      x2 RF ADJUST MODE
A146:A/D GAIN

  Auto Adjust (Push SET)

  ch     RSLT  ch     RSLT
  NA/NC        NB/ND
*ALL
```

```
      x2 RF ADJUST MODE
A146:A/D GAIN

  Auto Adjust (Push SET)

  ch     VR    ch     VR
  NA/NC  xx    NB/ND  xx
*ALL
```

Description of superimposed display



```
      x2 RF ADJUST MODE
A141:EQUALIZER

  Auto Adjust (Push SET)

  ch     RSLT  ch     RSLT
  NA           NB
  NC           ND
*ALL
```

Ex. A141 : EQUALIZER

① The display in this line changes. Each display and its meaning are described below.

Auto Adjust(Push SET) :	Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.
Condition NG :	Error condition defect.
Insert MR5-1 :	Requesting to insert the alignment tape.

② To perform the automatic adjustment for single channel (circuit), select a channel name using an * mark.
The adjustment result (OK, NG, or FAIL) will be displayed on the right of the channel name.

"OK" :	The channel could be adjusted normally.
"NG" :	The error condition of the channel was bad.
"FAIL" :	The automatic adjustment failed.

Note

"RSLT" indicates the result.

The adjustment data in each channel (circuit) is displayed while pressing the STOP button except in adjusting.

CAUTION

Do not press the STOP button in adjusting. If pressing it in adjusting, the tape stops and the automatic adjustment becomes impossible.

③ To perform the automatic adjustment for all channels (circuit) at a time, select "ALL" using the * mark. During the check, the adjustment result in each channel is displayed in area ②.
After the automatic adjustment in all channels is completed, the adjustment result (OK, NG, or FAIL) will be displayed on the right of "ALL".
"OK" : All channels (circuits) were "OK".
"NG" : Both "NG" and "OK" occurred in channels.
"FAIL" : One or more "FAIL" occurred in channels.

To execute the adjustment

(1) Insert the specified cassette tape.

Notes

- If the specified cassette tape is not used, the adjustment cannot be properly performed even if the message "Auto Adjust Complete" is displayed on completing the adjustment. Insert alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode).
- Take care that the tape transport mode does not change during automatic adjustment.
  Any adjustment cannot be properly performed in modes other than tape transport that was set automatically. Moreover, the automatic adjustment cannot be performed any longer or "FAIL" or "NG" is displayed as the adjustment result. Therefore, pay attention to the transport start position of the tape so that the end and beginning of the tape are not detected during adjustment. The minimum tape amount required for normal automatic adjustment is shown in the table on the next page. However, the tape amount increases or decreases when abnormality occurs.

Menu	Ordinary adjustment time	Tape amount required (Transport mode)
A141 : EQUALIZER	About 1 min./ALL, about 10 sec./channel	Adjustment time (x2 PLAY)
A143 : PLAY PLL	About 15 sec./ALL, about 10 sec./circuit	Adjustment time (x2 PLAY)
A146 : A/D GAIN	About 10 sec./ALL, about 5 sec./circuit	Adjustment time (x2 PLAY)

(2) Turn the MULTI CONTROL knob to set the * mark to the channel to be adjusted or ALL.
- Usually, select ALL.

(3) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- During the automatic adjustment, the message "Auto Adjusting ..." will be displayed.
- To cancel the automatic adjustment, press the F6 (EXIT) button once.
- When no cassette tape is inserted, the message "Insert MR5-1" will be displayed.
  In this case, insert the specified tape. The adjustment is then initiated after automatically running the tape.

Notes
- If the message "Auto Adjust (Push SET)" is continuously displayed, the non-recorded portion on the tape is judged to be played back. Set the tape position to the beginning of recorded portion.
- Keep the unit until automatic adjustment is completed. Any adjustment cannot be properly performed if the tape transport state is changed by touching some button or search dial. In this case, the adjustment freezes or the adjustment result becomes "FAIL" or "NG".

(4) Check the result of automatic adjustment on the superimposed display.
- If no abnormality is found, "OK" will be displayed on the right of the selected channel (circuit) or "ALL".
- If "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on page 3-103.
- To see the adjustment data, press the STOP button.

Note

"OK", "NG", or "FAIL" is also displayed in the menu display area.
The adjustment result for each channel (circuit) is displayed in the menu display area on turning the MULTI CONTROL knob after completing ALL adjustment.

(5) To exit the menu, press the F6 (EXIT) button once.
To execute the automatic adjustment again in this menu, go to step (2).

(6) To save the adjustment data, perform the following steps (7) and (8).

CAUTION

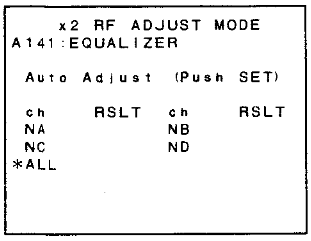
Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(7) Press the F6 (EXIT) button again.

(8) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Ex.: When ALL is selected
in A141 : EQUALIZER

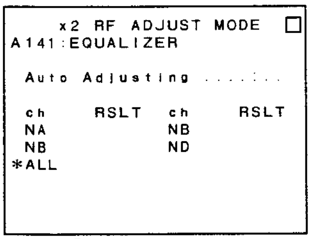


```
      x2 RF ADJUST MODE
A141:EQUALIZER

 Auto Adjust  (Push SET)

 ch     RSLT   ch     RSLT
 NA            NB
 NC            ND
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P

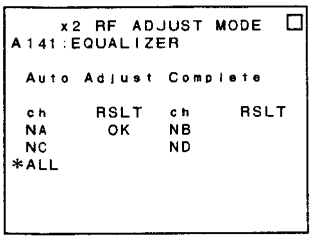
(2) ⇩ MULTI CONTROL

(3) ⇩ F5 (SET)



```
      x2 RF ADJUST MODE  □
A141:EQUALIZER

 Auto Adjusting .......

 ch     RSLT   ch     RSLT
 NA            NB
 NB            ND
*ALL
```

⇩

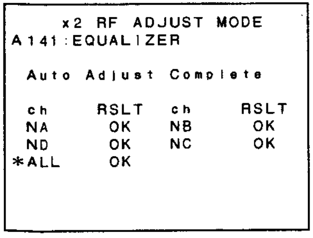


```
      x2 RF ADJUST MODE  □
A141:EQUALIZER

 Auto Adjust Complete

 ch     RSLT   ch     RSLT
 NA      OK    NB
 NC            ND
*ALL
```

⇩

(omitted)

⇩



```
      x2 RF ADJUST MODE
A141:EQUALIZER

 Auto Adjust Complete

 ch     RSLT   ch     RSLT
 NA      OK    NB      OK
 ND      OK    NC      OK
*ALL     OK
```

(4) ⇩ Check

(5) ⇩ F6 (EXIT)

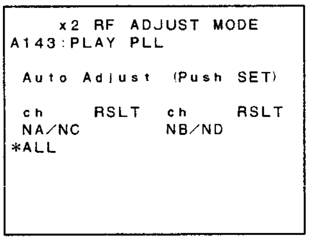
(6) ⇩

(7) ⇩ F6 (EXIT)

(8) Data saving

```
*A1F:NV-RAM CONTROL
```

Ex.: When ALL is selected
in A143 : PLAY PLL

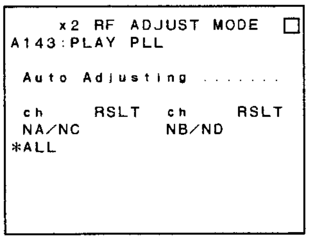


```
      x2 RF ADJUST MODE
A143:PLAY PLL

 Auto Adjust  (Push SET)

 ch     RSLT   ch     RSLT
 NA/NC         NB/ND
*ALL
```

(1) ⇩ Insert MR5-1/MR5-1P

(2) ⇩ MULTI CONTROL

(3) ⇩ F5 (SET)

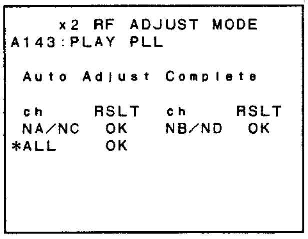


```
      x2 RF ADJUST MODE  □
A143:PLAY PLL

 Auto Adjusting .......

 ch     RSLT   ch     RSLT
 NA/NC         NB/ND
*ALL
```

⇩

(omitted)

⇩



```
      x2 RF ADJUST MODE
A143:PLAY PLL

 Auto Adjust Complete

 ch     RSLT   ch     RSLT
 NA/NC   OK    NB/ND   OK
*ALL     OK
```

(4) ⇩ Check

(5) ⇩ F6 (EXIT)

(6) ⇩

(7) ⇩ F6 (EXIT)

(8) Data saving

```
*A1F:NV-RAM CONTROL
```

A147 : A141-A146 ALL ADJUST

This menu executes the automatic adjustment of A141 to A146 described previously in the following order.

A143 : PLAY PLL
A146 : A/D GAIN
A141 : EQUALIZER

To execute the automatic adjustment

(1) Insert an alignment tape MR5-1 (for 525 mode) or MR5-1P (for 625 mode) rewound to the tape beginning.

Note

Be sure to use the specified alignment tape.
If the specified cassette tape is not used, the adjustment cannot be properly performed.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The automatic adjustment is initiated after automatically running the tape.
- The superimposed display during the automatic adjustment is displayed in the same way as when each adjustment is independently executed.
- The adjustment is completed in about two to three minutes unless "Condition NG" or "Auto Adjust Failure" does not occur.

(3) Check that the message "Auto Adjust Complete" is displayed on the superimposed display.
- When seeing the adjustment data, perform in each menu.

Note

If abnormality exists during adjustment, message "Condition NG" or "Auto Adjust Failure" is displayed in the same way as when the adjustment is executed independently.
The automatic adjustment stops in the adjustment menu.
- If the message "Condition NG" or "Auto Adjust Failure" is displayed, refer to the "For Condition NG/Automatic Adjustment Failure" on next page.
- To check the adjustment data, press the STOP button.

(4) To exit the menu, press the F6 (EXIT) button once.
- To execute readjustment, press the F6 (EXIT) button once, then select the menu again.

(5) To save the adjustment data, perform the following steps (6) and (7) .

CAUTION

Do not save the adjustment data when abnormality is found during automatic adjustment (When the message "Auto Adjust Failure" or "Condition NG" is displayed).

(6) Press the F6 (EXIT) button again.

(7) Execute SAVE ALL ADJUST DATA in A1F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS.

Example of display and operation

Superimposed display

```
      x2 RF ADJUST MODE
A147:A141-A146 ALL ADJUST

 Auto Adjust  (Push SET)
```

(1) ⇩ Insert HR5-1A

(2) ⇩ F5(SET)

```
      x2 RF ADJUST MODE  □
A147:A141-A146 ALL ADJUST
 A143:PLAY PLL
 Auto Adjusting

 ch    RSLT   ch     RSLT
 NA/NC        NB/ND
*ALL
```

⇩

(omitted)

⇩

```
      x2 RF ADJUST MODE  □
A147:A141-A146 ALL ADJUST
 A146:A/D GAIN
 Auto Adjusting

 ch    RSLT   ch     RSLT
 NA/NC        NB/ND
*ALL
```

⇩

(omitted)

⇩

```
      x2 RF ADJUST MODE  □
A147:A141-A146 ALL ADJUST
 A141:EQUALIZER
 Auto Adjusting

 ch    RSLT   ch     RSLT
 NA           NB
 NC           ND
*ALL
```

⇩

(omitted)

⇩

(continue)

(continued)

⇩

```
      x2 RF ADJUST MODE
A147:A141-A146 ALL ADJUST

 Auto Adjust Complete
```

(6) ⇩ Check

(7) ⇩ F6(EXIT)

(8) ⇩

(9) ⇩ F6(EXIT)

(10) Data saving

```
*A1F:NV-RAM CONTROL
```

For Condition NG/Automatic Adjustment Failure

Check according to the procedures below when the massage "Condition NG" or "Auto Adjust Failure" is displayed in the adjustment menus A141 to A147.

(1) Confirm whether the specified alignment tape is used. If the specified alignment tape is not used, execute the automatic adjustment by the specified one.
MR5-1 for 525 mode, MR5-1P for 625 mode
When no abnormality is found, the adjustment is completed.

(2) Clean the drum (video heads) according to the "For Condition NG (C110)" in "3-2-3. RF CHECK Mode (C1)".
This operation is not required when the drum has been already cleaned.

(3) When message "Condition NG" or "Auto Adjust Failure" is displayed during execution of menus other than menu A147 or A143, perform the menu A147.
When no abnormality is found, the adjustment is completed.

If the message "Condition NG" is still displayed, the possible cause below are considered.

- Servo system adjustment defect or circuit defect
  ⇨ Readjust the servo system. (A00 : SERVO ADJUST)
  ⇨ Check the servo system. (C01 : MOTOR)
- RF system adjustment defect
  ⇨ Readjust the RF system. (A11 : IMX RF ADJUST)
- Worn PB head in the drum assembly
  ⇨ After checking the head projection (Section 9), replace the upper drum assembly or drum assembly as required.
- In the tape transport system adjustment defect or component part installation defect
  ⇨ Readjust the tape transport system or reinstall the part.
- EQ-84 board defect
- Drum assembly defect

If the message "Auto Adjust Failure" is displayed, the following causes also are considered.

- Brush/slip ring assembly defect or its part installation/connection defect
  ⇨ Replace or reinstall the brush/slip ring assembly.
- Harness (between the EQ-84 board and drum assembly) connection defect

A1F : NV-RAM CONTROL

Each menu is used to save the adjusted RF adjustment data into the NV-RAM.
The items of adjusted formats can be saved at one time.

All the RF adjustment data can return to the status before adjustment when executing "ALL DATA PREVIOUS" before saving the adjustment data into the NV-RAM.

Notes

- Do not save the adjustment data into the NV-RAM when abnormality is found during automatic adjustment (when the message "Auto Adjust Failure" or " Condition NG"is displayed).
- When saving the adjustment data, only the values of items executed the adjustment will be overwritten.
- When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To execute the menu

(1) Turn the MULTI CONTROL knob to set the * mark on the superimposed display as described below.
To save the adjustment data after adjustment:
⇨ "SAVE ALL ADJUST DATA"
To return the adjustment data before adjustment:
⇨ "ALL DATA PREVIOUS"

(2) Press the F5 (SET) button once.
- On pressing it, the data transmission is initiated.
- On the superimposed display, a message "Saving ..." or "Loading ..." will be displayed.

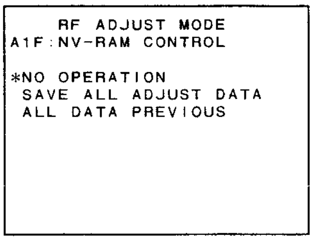
(3) Check that the data transmission is completed.
- On completing the data transmission:
On the superimposed display, a message "Save Complete." or "Load Complete" will be displayed.
In the menu display area, a message "SaveComp" or "LoadComp" will be displayed.

(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation

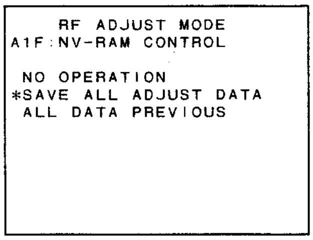
(In data save at A1F)

Superimposed display



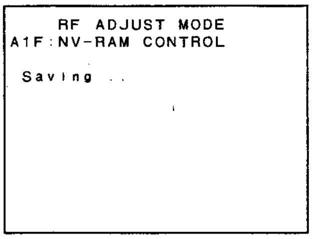
```
  RF ADJUST MODE
A1F:NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(1) ⇩ MULTI CONTROL



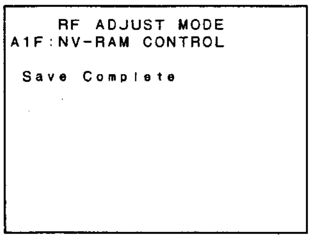
```
  RF ADJUST MODE
A1F:NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(2) ⇩ F5 (SET)



```
  RF ADJUST MODE
A1F:NV-RAM CONTROL

 Saving ..
```

⇩

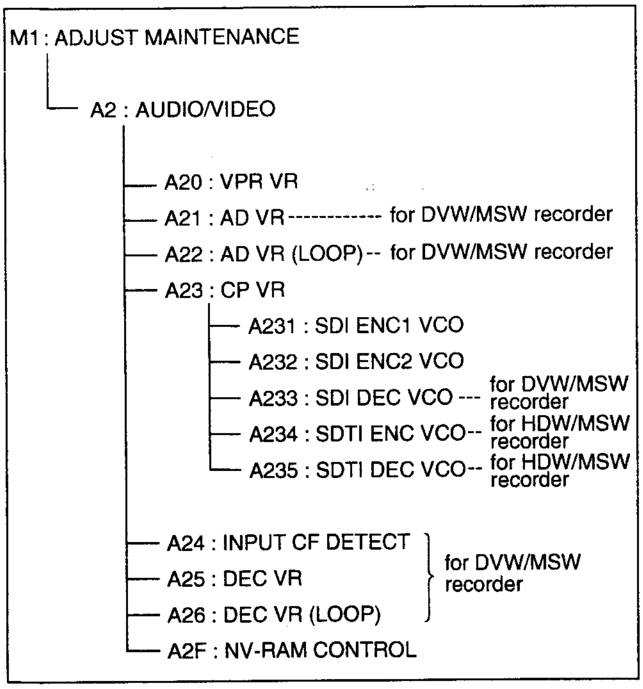


```
  RF ADJUST MODE
A1F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ F6 (EXIT)

3-3-4. AUDIO/VIDEO Adjustment Mode (A2)

The A2 : AUDIO/VIDEO mode is used to adjust the audio and video systems.
This unit has seven menus and one submode.
In sub mode A23 : CP VR, five menus are available.


M1 : ADJUST MAINTENANCE
A2 : AUDIO/VIDEO
A20 : VPR VR
A21 : AD VR ----------- for DVW/MSW recorder
A22 : AD VR (LOOP) -- for DVW/MSW recorder
A23 : CP VR
A231 : SDI ENC1 VCO
A232 : SDI ENC2 VCO
A233 : SDI DEC VCO --- for DVW/MSW recorder
A234 : SDTI ENC VCO -- for HDW/MSW recorder
A235 : SDTI DEC VCO -- for HDW/MSW recorder
A24 : INPUT CF DETECT
A25 : DEC VR
A26 : DEC VR (LOOP)
for DVW/MSW recorder
A2F : NV-RAM CONTROL

Menu Tree of AUDIO/VIDEO Adjustment Mode

CAUTION

Do not change the adjustment data carelessly. This may cause a trouble. For the actual adjustment, refer to the adjustment method described in Section 8 Electrical Alignment.
If you have changed the adjustment data carelessly, execute ALL DATA PREVIOUS in A2F : NV-RAM CONTROL menu or turn off the power of this unit without selecting A2F : NV-RAM CONTROL menu.
Never execute SAVE ALL ADJUST DATA.

The adjustment menus other than submenu A23 and menu A24 are used for manual adjustment.
In submenu A23 and menu A24, automatic adjustment (AUTO) or manual adjustment (MANUAL) can be selected.
For the automatic adjustment, refer to the operation example described in each menu.

To change the adjustment data manually

(1) When seeing on the superimposed display, turn the MULTI CONTROL knob to set the * mark to the item to be adjusted.
When seeing in the menu display area, turn the MULTI CONTROL knob to display the item to be adjusted.

(2) To increase or decrease the adjustment data, turn the MULTI CONTROL knob while pressing the HOME button.

To execute the automatic adjustment

(1) When seeing on the superimposed display, turn the MULTI CONTROL knob to set the * mark to "MANUAL".
When seeing in the menu display area, turn the MULTI CONTROL knob to display "MANUAL".

(2) Turn the MULTI CONTROL knob in clockwise (↻) direction while pressing the HOME button to display a message "Auto (Push SET Button)".

(3) Press the F5 (SET) button once to initiate the automatic adjustment.
- The display changes as described below. The displayed data value also changes.

Auto adjusting .. :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.

To return the adjustment data to the former state

Execute ALL DATA PREVIOUS in A2F : NV-RAM CONTROL menu.

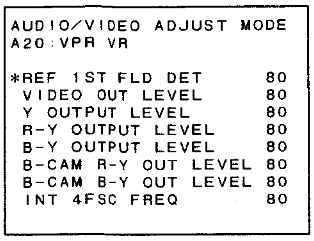
Note

The current adjustment data can not return to the former saved data after executing SAVE ALL DATA ADJUST DATA.

To save the adjustment data

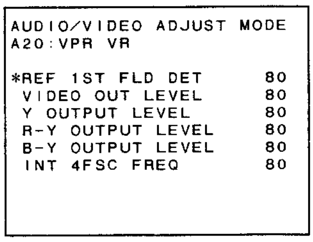
Execute SAVE ALL ADJUST DATA in A2F : NV-RAM CONTROL menu.

A20 : VPR VR



```
AUDIO/VIDEO ADJUST MODE
A20:VPR VR

*REF 1ST FLD DET        80
 VIDEO OUT LEVEL        80
 Y OUTPUT LEVEL         80
 R-Y OUTPUT LEVEL       80
 B-Y OUTPUT LEVEL       80
 B-CAM R-Y OUT LEVEL    80
 B-CAM B-Y OUT LEVEL    80
 INT 4FSC FREQ          80
```

In 525 Mode



```
AUDIO/VIDEO ADJUST MODE
A20:VPR VR

*REF 1ST FLD DET        80
 VIDEO OUT LEVEL        80
 Y OUTPUT LEVEL         80
 R-Y OUTPUT LEVEL       80
 B-Y OUTPUT LEVEL       80
 INT 4FSC FREQ          80
```

In 625 Mode

This menu is used to adjust the reference signal and analog video output systems on the VPR-64/91 board. In 525 and 625 modes, the displayed adjustment items differ.

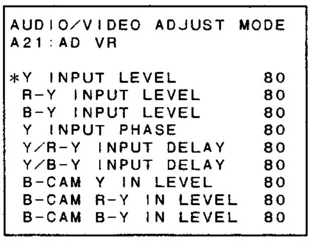
For HDW series and MSW series, the adjustments items below must be adjusted in both 525 and 625 modes.

Adjustment item	Description
REF 1ST FLD DET	First-field detection timing of reference signal
VIDEO OUT LEVEL	Composite video output level
Y OUTPUT LEVEL	Component video Y output level
R-Y OUTPUT LEVEL	Component video R-Y output level
B-Y OUTPUT LEVEL	Component video B-Y output level
INT 4FSC FREQ	Free-running frequency of internal reference signal 4fsc

The adjustment items below are used exclusively for the 525 mode.

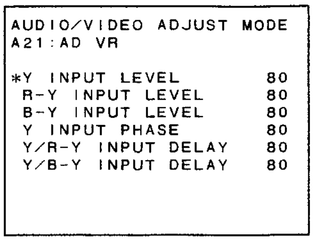
Adjustment item	Description
B-CAM R-Y OUT LEVEL	R-Y output (Betacam) level
B-CAM B-Y OUT LEVEL	B-Y output (Betacam) level

A21 : AD VR



```
AUDIO/VIDEO ADJUST MODE
A21:AD VR

*Y INPUT LEVEL          80
 R-Y INPUT LEVEL        80
 B-Y INPUT LEVEL        80
 Y INPUT PHASE          80
 Y/R-Y INPUT DELAY      80
 Y/B-Y INPUT DELAY      80
 B-CAM Y IN LEVEL       80
 B-CAM R-Y IN LEVEL     80
 B-CAM B-Y IN LEVEL     80
```

In 525 Mode



```
AUDIO/VIDEO ADJUST MODE
A21:AD VR

*Y INPUT LEVEL          80
 R-Y INPUT LEVEL        80
 B-Y INPUT LEVEL        80
 Y INPUT PHASE          80
 Y/R-Y INPUT DELAY      80
 Y/B-Y INPUT DELAY      80
```

In 625 Mode

This menu is used to adjust the analog component video input system. In 525 and 625 modes, the displayed adjustment items differ.
This menu is used for DVW/MSW recorder.

The adjustment items below are adjusted in either 525 or 625 mode.

Adjustment item	Description
Y INPUT LEVEL	Y input level
R-Y INPUT LEVEL	R-Y input level
B-Y INPUT LEVEL	B-Y input level
Y INPUT PHASE	Y input phase
Y/R-Y INPUT DELAY	R-Y input delay compensation
Y/B-Y INPUT DELAY	B-Y input delay compensation

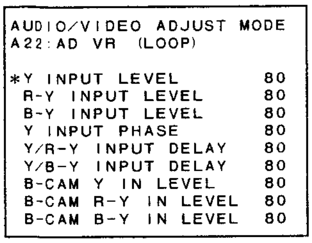
The adjustment items below are used exclusively for the 525 mode.

Adjustment item	Description
B-CAM Y IN LEVEL	Y input (Betacam) level
B-CAM R-Y IN LEVEL	R-Y input (Betacam) level
B-CAM B-Y IN LEVEL	B-Y input (Betacam) level

Note

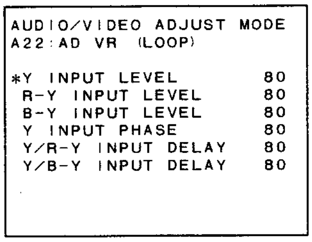
The adjustment data in A21 : AD VR menu is used in common with A22 : AD VR (LOOP) menu.

A22 : AD VR (LOOP)



```
AUDIO/VIDEO ADJUST MODE
A22:AD VR (LOOP)

*Y INPUT LEVEL          80
 R-Y INPUT LEVEL        80
 B-Y INPUT LEVEL        80
 Y INPUT PHASE          80
 Y/R-Y INPUT DELAY      80
 Y/B-Y INPUT DELAY      80
 B-CAM Y IN LEVEL       80
 B-CAM R-Y IN LEVEL     80
 B-CAM B-Y IN LEVEL     80
```

In 525 Mode



```
AUDIO/VIDEO ADJUST MODE
A22:AD VR (LOOP)

*Y INPUT LEVEL          80
 R-Y INPUT LEVEL        80
 B-Y INPUT LEVEL        80
 Y INPUT PHASE          80
 Y/R-Y INPUT DELAY      80
 Y/B-Y INPUT DELAY      80
```

In 625 Mode

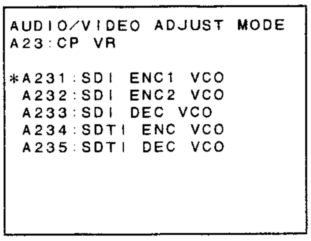
In this menu, the most suitable signal for adjustment is output from the internal video test signal generator (refer to the table below), and the analog component video input system can be adjusted with the multi-loop function activated. (For DVW/MSW recorder)
The adjustment item is the same as for A21: AD VR.

Adjustment item	Test signal
Y INPUT LEVEL	100 % Color Bars
R-Y INPUT LEVEL	100 % Color Bars
B-Y INPUT LEVEL	100 % Color Bars
Y INPUT PHASE	NTC7 (NTSC): 525 mode Line330 (625): 625 mode
Y/R-Y INPUT DELAY	Bowtie
Y/B-Y INPUT DELAY	Bowtie
B-CAM Y IN LEVEL	75 % Color Bars
B-CAM R-Y IN LEVEL	75 % Color Bars
B-CAM B-Y IN LEVEL	75 % Color Bars

Note

The adjustment data in A22 : AD VR (LOOP) menu is used in common with A21 : AD VR menu.

A23 : CP VR



```
AUDIO/VIDEO ADJUST MODE
A23:CP VR

*A231:SDI ENC1 VCO
 A232:SDI ENC2 VCO
 A233:SDI DEC VCO
 A234:SDTI ENC VCO
 A235:SDTI DEC VCO
```

This menu is used to adjust the free-running frequency of the VCO for SDI and SDTI input/output interfaces. Automatic or manual adjustment can be selected.

A231 : SDI ENC1 VCO

This menu is used for an SDI output interface (SDI encoder).

A232 : SDI ENC2 VCO

This menu is used for an SDI output interface (SDI encoder) with superimpose function.

A233 : SDI DEC VCO

This menu is used for an SDI input interface (SDI decoder). (For DVW/MSW recorder)

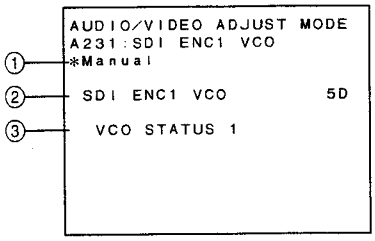
A234 : SDTI ENC VCO

This menu is used for an SDTI output interface (SDTI encoder). (For HDW/MSW series)

A235 : SDTI-DEC VCO

This menu is used for an SDTI input interface (SDTI decoder). (For HDW/MSW recorder)

Description of superimposed display



```
AUDIO/VIDEO ADJUST MODE
A231 : SDI ENC1 VCO
*Manual
 SDI ENC1 VCO          5D
  VCO STATUS 1
```

Ex.: A231 : SDI ENC1 VCO

① The adjustment mode (manual or automatic) or the message during automatic adjustment is displayed in this line.

Manual :	Adjustment mode is set to the manual adjustment.
Auto (Push SET Button) :	Requesting to press button to initiate the automatic adjustment.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.

Note

The adjustment data can be manually changed even if message “Auto (Push SET Button)” is displayed.

② The adjustment item and adjustment data value are displayed in this line.

③ The VCO status will be displayed as “0” or “1”.
0: When the specification is not satisfied
1: When the specification is satisfied

Change of adjustment mode

The relation between the adjustment mode and display is shown in the table below.

Adj. mode	Superimposed display	Menu display area
Manual adjustment	Manual	Manual
Automatically adjustable	Auto (Push SET Button)	Auto

(i) Turn the MULTI CONTROL knob in counterclockwise (↺) direction to set the * mark to line ① on the superimposed display. (In a menu display area, “Manual” or “Auto” will be displayed.)

(ii) Turn the MULTI CONTROL knob while pressing the HOME button.
Manual ⇨ Automatic: HOME + MULTI CONTROL (↻)
Manual ⇦ Automatic: HOME + MULTI CONTROL (↺)

To execute the automatic adjustment

(1) Display “Auto (Push SET Button)” on the superimposed display or “Auto” in the menu display area according to the “Change of adjustment mode” described above.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The superimposed display changes to “Auto Adjusting...”. The displayed data value also changes. The display in the menu display area does not change.

(3) Check that the automatic adjustment is completed on the superimposed display.
- On completing it, the message “Auto Adjust Complete” will be displayed.

Note

If the message “Auto Adjust Failure” is displayed, refer to the “When failing the automatic adjustment” on next page.

(4) To exit the menu, press the F6 (EXIT) button once. To execute the automatic adjustment again in this menu, go to step (2).

(5) To save the adjustment data into the NV-RAM, execute SAVE ALL ADJUST DATA in A2F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A2F : NV-RAM CONTROL menu.

When failing the automatic adjustment

The following circuit board is considered to be defective.

Submenu No.	Circuit board name
A231, A232 or A233	SDI-52 board or VPR-64/91 board
A234 or A235	EPR-1 board or DIF-1.34 board

Note on manual adjustment

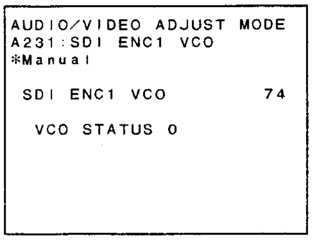
Measuring equipment are required in performing the manual adjustment. For the actual manual adjustment, refer to Section 8 Electrical Alignment.

Note

For the data changing, refer to the "To change the adjustment data manually" on page 3-105.

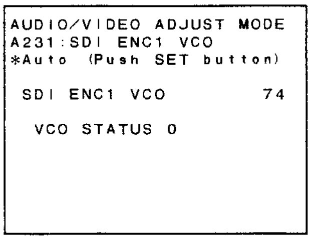
Example of display and operation

Example of A231 : SDI ENC1 VCO



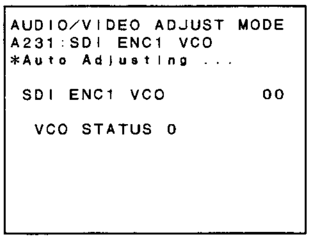
```
AUDIO/VIDEO ADJUST MODE
A231:SDI ENC1 VCO
*Manual

 SDI ENC1 VCO          74

  VCO STATUS 0
```

(1) ⇩ HOME + MULTI CONTROL (↻)



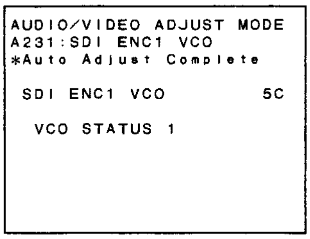
```
AUDIO/VIDEO ADJUST MODE
A231:SDI ENC1 VCO
*Auto (Push SET button)

 SDI ENC1 VCO          74

  VCO STATUS 0
```

(2) ⇩ F5(SET)



```
AUDIO/VIDEO ADJUST MODE
A231:SDI ENC1 VCO
*Auto Adjusting ...

 SDI ENC1 VCO          00

  VCO STATUS 0
```

⇩
(omitted)
⇩

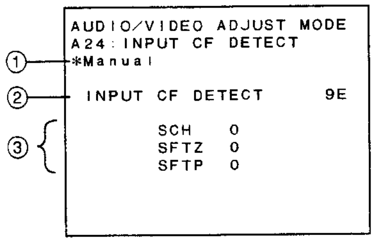


```
AUDIO/VIDEO ADJUST MODE
A231:SDI ENC1 VCO
*Auto Adjust Complete

 SDI ENC1 VCO          5C

  VCO STATUS 1
```

(3) ⇩ Check
(4) ⇩ F6(EXIT)
(5) Data saving

```
*A2F:NV-RAM CONTROL
```

A24 : INPUT CF DETECT



```
AUDIO/VIDEO ADJUST MODE
A24 : INPUT CF DETECT
*Manual

 INPUT CF DETECT        9E

        SCH   0
        SFTZ  0
        SFTP  0
```

This menu is used to adjust the color frame detection timing of a composite video input signal. This is exclusive for the DVW/MSW recorder.
Preparation (refer to Section 8-6-8) is required for the adjustment.

Description of superimposed display

① The adjustment mode (manual or automatic) or the message during automatic adjustment is displayed in this line.

Manual :	Adjustment mode is set to the manual adjustment.
Auto (Push SET Button):	Requesting to press the F5 (SET) button to initiate the automatic adjustment.
Auto Adjusting ... :	Automatic adjustment is in progress.
Auto Adjust Complete :	Automatic adjustment was completed.
Auto Adjust Failure :	Automatic adjustment failed.

Note

The adjustment data can be manually changed even if message "Auto (Push SET Button)" is displayed.

② The adjustment item and adjustment data value are displayed in this line.

③ Each status will be displayed as "0" or "1".
0: When the specification is not satisfied
1: When the specification is satisfied
(For SFTP, the status is displayed in alternate "0" and "1" when the specification is satisfied.)

Change of adjustment mode

The relation between the adjustment mode and display is shown in the table below.

Adj. mode	Superimposed display	Menu display area
Manual adjustment	Manual	Manual
Automatically adjustable	Auto (Push SET Button)	Auto

(i) Turn the MULTI CONTROL knob in counterclockwise (↺) direction to set the * mark to line ① on the superimposed display. (In a menu display area, "Manual" or "Auto" will be displayed.)

(ii) Turn the MULTI CONTROL knob while pressing the HOME button.
Manual ⇨ Automatic: HOME + MULTI CONTROL (↻)
Manual ⇦ Automatic: HOME + MULTI CONTROL (↺)

To execute the automatic adjustment

(1) Display "Auto (Push SET Button)" on the superimposed display or "Auto" in the menu display area according to the "Change of adjustment mode" described above.

(2) Press the F5 (SET) button to initiate the automatic adjustment.
- The superimposed display changes to "Auto Adjusting...". The displayed data value also changes. The display in the menu display area does not change.

(3) Check the completion of the automatic adjustment and status of each item on the superimposed display.
- On completing it, the message "Auto Adjust Complete" will be displayed. Status for SCH and SFTZ are displayed as "1" and for SFTP is displayed in alternate "0" and "1".

Note

If preparation for adjustments is not proper, the message "Auto Adjust Failure" is displayed.

(4) To exit the menu, press the F6 (EXIT) button once. To execute the automatic adjustment again in this menu, go to step (2).

(5) To save the adjustment data into the NV-RAM, execute SAVE ALL ADJUST DATA in A2F : NV-RAM CONTROL menu.
To return the adjustment data to the former saved data before adjustment, execute ALL DATA PREVIOUS in A2F : NV-RAM CONTROL menu.

Note on manual adjustment

Check the adjustment data range in which the SCH status is set to "1" and set the adjustment data to the intermediate value in performing the manual adjustment.

Note

For the manual adjustment, refer to the "To change the adjustment data manually" on page 3-105.

Example of display and operation

Superimposed display

```
AUDIO/VIDEO ADJUST MODE
A24:INPUT CF DETECT
*Manual

 INPUT CF DETECT      9E

       SCH    0
       SFTZ   0
       SFTP   0
```

(1) ⇩ HOME + MULTI CONTROL(○)

```
AUDIO/VIDEO ADJUST MODE
A24:INPUT CF DETECT
*Auto (Push SET button)

 INPUT CF DETECT      9E

       SCH    0
       SFTZ   0
       SFTP   0
```

(2) ⇩ F5(SET)

```
AUDIO/VIDEO ADJUST MODE
A24:INPUT CF DETECT
*Auto Adjusting ...

 INPUT CF DETECT      00

       SCH    0
       SFTZ   0
       SFTP   0
```

⇩
(omitted)
⇩

```
AUDIO/VIDEO ADJUST MODE
A24:INPUT CF DETECT
*Auto Adjust Complete

 INPUT CF DETECT      85

       SCH    1
       SFTZ   1
       SFTP   1
```

(3) ⇩ Check
(4) ⇩ F6(EXIT)
(5) Data saving

```
*A2F:NV-RAM CONTROL
```

A25 : DEC VR

```
AUDIO/VIDEO ADJUST MODE
A25:DEC VR

*VIDEO GAIN            80
 AGC VIDEO GAIN        80
 VIDEO PEDESTAL        80
```

This menu is used to adjust the composite video input system. This is exclusive for the DVW/MSW recorder.

Adjustment item	Description
VIDEO GAIN	Composite video input level (During AGC OFF setting)
AGC VIDEO GAIN	Composite video input level (During AGC ON setting)
VIDEO PEDESTAL	Composite video input level pedestal

Note

The adjustment data in A25 : DEC VR menu is used in common with the same adjustment item in A26 : DEC VR (LOOP) menu.

A26 : DEC VR (LOOP)

```
AUDIO/VIDEO ADJUST MODE
A26:DEC VR (LOOP)

*VIDEO GAIN            80
```

This menu is used to adjust the composite video input system.
The most suitable signal (refer to the table below) for adjustment is output from the internal video test signal generator, and the composite video input system can be adjusted with the multi-loop function activated. This is exclusive for the DVW/MSW recorder.

Adjustment item	Test signal
VIDEO GAIN	100% Color Bars

Note

The adjustment data in A26 : DEC VR (LOOP) menu is used in common with the same adjustment item in A25 : DEC VR menu.

A2F : NV-RAM CONTROL

This menu is used to save the audio/video adjustment data adjusted in the A2 : AUDIO/VIDEO mode into the NV-RAM.
The current adjustment data can return to the former saved data before adjustment when executing ALL DATA PREVIOUS without saving the adjustment data into the NV-RAM.

Note

When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To execute the menu

(1) Turn the MULTI CONTROL knob to set the ∗ mark on the superimposed display as described below.
To save the adjustment data after adjustment:
⇨ "SAVE ALL ADJUST DATA"
To return to the adjustment data before adjustment:
⇨ "ALL DATA PREVIOUS"

(2) Press the F5 (SET) button once.
- On pressing it, the data transmission is initiated.
- On the superimposed display, a message "Saving ..." or "Loading ..." will be displayed.

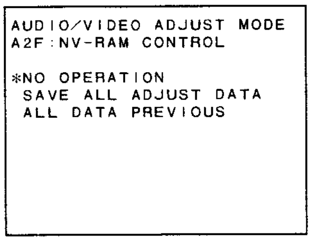
(3) Check that the data transmission is completed.
- On completing the data transmission:
On the superimposed display, a message "Save Complete" or "Load Complete" will be displayed.
In the menu display area, a message "SaveComp" or "LoadComp" will be displayed.

(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation

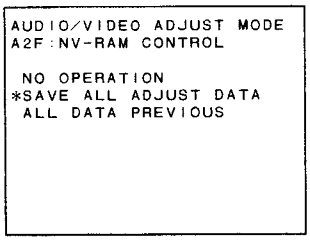
(In data save)

Superimposed display



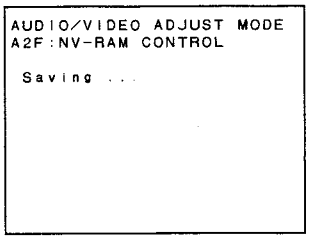
```
AUDIO/VIDEO ADJUST MODE
A2F :NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(1) ⇩ MULTI CONTROL (↻)



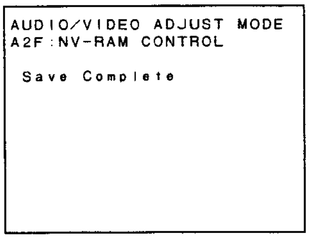
```
AUDIO/VIDEO ADJUST MODE
A2F :NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(2) ⇩ F5 (SET)



```
AUDIO/VIDEO ADJUST MODE
A2F :NV-RAM CONTROL

 Saving ...
```

⇩



```
AUDIO/VIDEO ADJUST MODE
A2F :NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ F6 (EXIT)

3-3-5. BETACAM PB (DM) Adjustment Mode (A3)

The A3 : BETACAM PB (DM) mode is used to adjust the PB system based on a Betacam/Betacam SP format. It is displayed for units that can play back the analog Betacam. Two types of menu structure are available : for the standard mode and for the alternative mode.

Original : The NTSC model plays back in the 525 mode, or the PAL model plays back in the 625 mode.
Alternate : The NTSC model plays back in the 625 mode, or the PAL model plays back in the 525 mode.

- M1 : ADJUST MAINTENANCE
  - A3 : BETACAM PB (DM)
    - Standard mode
      - A30 : RF GAIN VR (EQ VR)
      - A31 : COS EQ VR (METAL-Y)
      - A32 : COS EQ VR (METAL-C)
      - A33 : COS EQ VR (OXIDE-Y)
      - A34 : COS EQ VR (OXIDE-C)
      - A35 : G-BAND/OMC DC VR
      - A36 : DO TH/ENV TH VR
      - A37 : OMC LIM BALANCE VR
      - A38 : DEMO BAL/ETC. VR
      - A3F : NV-RAM CONTROL
    - Alternative mode
      - A30 : RF GAIN VR (EQ VR)
      - A31 : COS EQ VR (METAL)
      - A32 : COS EQ VR (OXIDE)
      - A33 : G-BAND VR
      - A34 : DO TH VR
      - A3F : NV-RAM CONTROL

Menu Tree of BETACAM PB (DM) Adjustment Mode

CAUTION

Do not change the adjustment data carelessly. This may cause a trouble. For the actual adjustment, refer to the adjustment method described in Section 8 Electrical Alignment.
If you have changed the adjustment data carelessly, execute ALL DATA PREVIOUS in A3F : NV-RAM CONTROL menu or turn off the power of this unit without selecting A3F : NV-RAM CONTROL menu.
Never execute SAVE ALL ADJUST DATA.

To change the adjustment data manually

(1) When seeing the superimposed display, turn the MULTI CONTROL knob to set the * mark to the item to be adjusted.
When seeing the menu display area, turn the MULTI CONTROL knob to display the item to be adjusted.

(2) To increase or decrease the adjustment data, turn the MULTI CONTROL knob while pressing the HOME button.

To return the adjustment data to the former state

Execute ALL DATA PREVIOUS in the A3F : NV-RAM CONTROL menu.

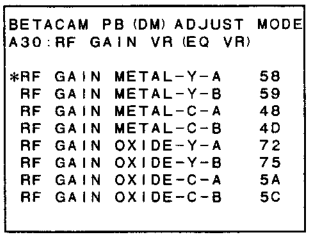
Note

The current adjustment data can not return to the former state after executing SAVE ALL DATA ADJUST DATA.

To save the adjustment data

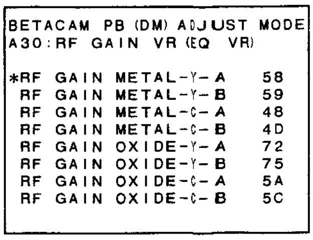
Execute SAVE ALL ADJUST DATA in the A3F : NV-RAM CONTROL menu.

Standard **A30 : EQ VR**



```
BETACAM PB (DM) ADJUST MODE
A30:RF GAIN VR (EQ VR)

*RF GAIN METAL-Y-A    58
 RF GAIN METAL-Y-B    59
 RF GAIN METAL-C-A    48
 RF GAIN METAL-C-B    4D
 RF GAIN OXIDE-Y-A    72
 RF GAIN OXIDE-Y-B    75
 RF GAIN OXIDE-C-A    5A
 RF GAIN OXIDE-C-B    5C
```

Alternative **A30 : EQ VR**



```
BETACAM PB (DM) ADJUST MODE
A30:RF GAIN VR (EQ VR)

*RF GAIN METAL-Y-A    58
 RF GAIN METAL-Y-B    59
 RF GAIN METAL-C-A    48
 RF GAIN METAL-C-B    4D
 RF GAIN OXIDE-Y-A    72
 RF GAIN OXIDE-Y-B    75
 RF GAIN OXIDE-C-A    5A
 RF GAIN OXIDE-C-B    5C
```

This menu is used to adjust the gain of a PB RF amplifier (on the EQ-84 board) for the Betacam/Betacam SP format.

Standard A31 : COS EQ VR (METAL-Y)

```
BETACAM PB (DM) ADJUST MODE
A31:COS EQ VR (METAL-Y)

*EQ1  METAL-Y-A      55
 EQ1  METAL-Y-B      55
 MAIN METAL-Y-A      55
 MAIN METAL-Y-B      55
 SUB  METAL-Y-A      55
 SUB  METAL-Y-B      55
```

Standard A32 : COS EQ VR (METAL-C)

```
BETACAM PB (DM) ADJUST MODE
A32:COS EQ VR (METAL-C)

*EQ1  METAL-C-A      55
 EQ1  METAL-C-B      55
 MAIN METAL-C-A      55
 MAIN METAL-C-B      55
 SUB  METAL-C-A      55
 SUB  METAL-C-B      55
```

Alternative A31 : COS EQ VR (METAL)

```
BETACAM PB (DM) ADJUST MODE
A31:COS EQ VR (METAL)

*EQ1  METAL-Y-A      55
 EQ1  METAL-Y-B      55
 SUB  METAL-Y-A      55
 SUB  METAL-Y-B      55
 EQ1  METAL-C-A      55
 EQ1  METAL-C-B      55
 SUB  METAL-C-A      55
 SUB  METAL-C-B      55
```

These are used to adjust the frequency response of the primary cosine equalizer and secondary cosine equalizer for a metal tape.

Standard A33 : COS EQ VR (OXIDE-Y)

```
BETACAM PB (DM) ADJUST MODE
A33:COS EQ VR (OXIDE-Y)

*EQ1  OXIDE-Y-A      55
 EQ1  OXIDE-Y-B      55
 MAIN OXIDE-Y-A      55
 MAIN OXIDE-Y-B      55
 SUB  OXIDE-Y-A      55
 SUB  OXIDE-Y-B      55
```

Standard A34 : COS EQ VR (OXIDE-C)

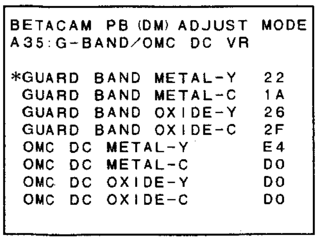
```
BETACAM PB (DM) ADJUST MODE
A34:COS EQ VR (OXIDE-C)

*EQ1  OXIDE-C-A      55
 EQ1  OXIDE-C-B      55
 MAIN OXIDE-C-A      55
 MAIN OXIDE-C-B      55
 SUB  OXIDE-C-A      55
 SUB  OXIDE-C-B      55
```

Alternative A32 : COS EQ VR (OXIDE)

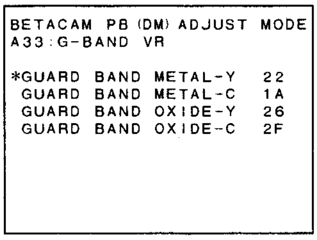
```
BETACAM PB (DM) ADJUST MODE
A32:COS EQ VR (OXIDE)

*EQ1  OXIDE-Y-A      55
 EQ1  OXIDE-Y-B      55
 SUB  OXIDE-Y-A      55
 SUB  OXIDE-Y-B      55
 EQ1  OXIDE-C-A      55
 EQ1  OXIDE-C-B      55
 SUB  OXIDE-C-A      55
 SUB  OXIDE-C-B      55
```

These are used to adjust the frequency response of the primary cosine equalizer and secondary cosine equalizer for an oxide tape.

Standard A35 : G-BAND/OMC DC VR   Alternative A33 : G-BAND VR



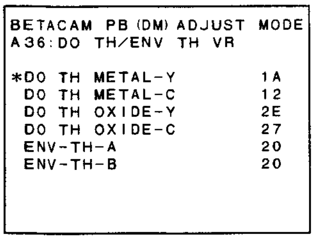
```
BETACAM PB (DM) ADJUST MODE
A35:G-BAND/OMC DC VR

*GUARD BAND METAL-Y   22
 GUARD BAND METAL-C   1A
 GUARD BAND OXIDE-Y   26
 GUARD BAND OXIDE-C   2F
 OMC DC METAL-Y       E4
 OMC DC METAL-C       D0
 OMC DC OXIDE-Y       D0
 OMC DC OXIDE-C       D0
```



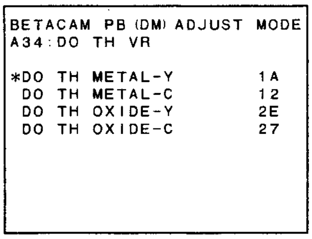
```
BETACAM PB (DM) ADJUST MODE
A33:G-BAND VR

*GUARD BAND METAL-Y   22
 GUARD BAND METAL-C   1A
 GUARD BAND OXIDE-Y   26
 GUARD BAND OXIDE-C   2F
```

These are used to adjust the guard band width and to set the DC offset level of an over-modulation compensation circuit.

Standard A36 : DO TH/ENV TH VR   Alternative A34 : DO TH VR



```
BETACAM PB (DM) ADJUST MODE
A36:DO TH/ENV TH VR

*DO TH METAL-Y        1A
 DO TH METAL-C        12
 DO TH OXIDE-Y        2E
 DO TH OXIDE-C        27
 ENV-TH-A             20
 ENV-TH-B             20
```



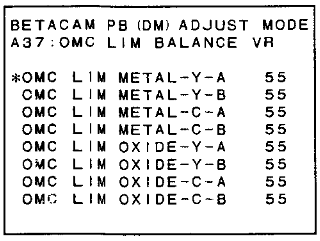
```
BETACAM PB (DM) ADJUST MODE
A34:DO TH VR

*DO TH METAL-Y        1A
 DO TH METAL-C        12
 DO TH OXIDE-Y        2E
 DO TH OXIDE-C        27
```

These are used to adjust each dropout threshold level of Y and C channels and to set the RF envelope threshold level.

Note

There are adjustment data for A ch (A) and B ch (B) provided for the RF envelope threshold level.

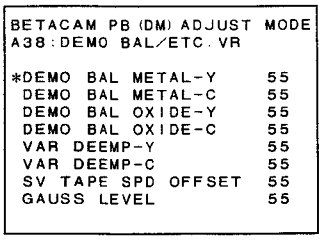
Standard A37 : OMC LIM BALANCE VR



```
BETACAM PB (DM) ADJUST MODE
A37:OMC LIM BALANCE VR

*OMC LIM METAL-Y-A   55
 OMC LIM METAL-Y-B   55
 OMC LIM METAL-C-A   55
 OMC LIM METAL-C-B   55
 OMC LIM OXIDE-Y-A   55
 OMC LIM OXIDE-Y-B   55
 OMC LIM OXIDE-C-A   55
 OMC LIM OXIDE-C-B   55
```

This menu is used to adjust the limiter balance of the PB RF signal.

Standard A38 : DEMO BAL/ETC. VR



```
BETACAM PB (DM) ADJUST MODE
A38:DEMO BAL/ETC.VR

*DEMO BAL METAL-Y      55
 DEMO BAL METAL-C      55
 DEMO BAL OXIDE-Y      55
 DEMO BAL OXIDE-C      55
 VAR DEEMP-Y           55
 VAR DEEMP-C           55
 SV TAPE SPD OFFSET    55
 GAUSS LEVEL           55
```

- "DEMO BAL" is used to adjust the carrier balance of the demodulator.
- "VAR DEEMP" is used to adjust the emphasis in the variable speed playback.
- "SV TAPE SPD OFFSET" is used to adjust the video level control offset according to the tape speed in the variable speed playback.
- "GAUSS LEVEL" is used to adjust the GAUSS control level. This menu is displayed for the models having Digital Betacam playback function.

A3F : NV-RAM CONTROL

This menu is used to save the Betacam PB adjustment data adjusted in the A3 : BETACAM PB (DM) mode into the NV-RAM.
The current adjustment data can return to the former saved data before adjustment when executing “ALL DATA PREVIOUS” without saving the adjustment data into the NV-RAM.

Note

When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To execute the menu

(1) Turn the MULTI CONTROL knob to set the ∗ mark on the superimposed display as described below.
To save the adjustment data after adjustment:
⇨ “SAVE ALL ADJUST DATA”
To return to the adjustment data before adjustment:
⇨ “ALL DATA PREVIOUS”
- In the menu display area, a message “Save” or “PREVIOUS” will be displayed, respectively.

(2) Press the F5 (SET) button once.
- On pressing it, the data transmission is initiated.
- A message “Saving...” or “Loading...” will be displayed.

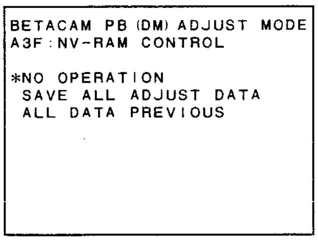
(3) Check that the data transmission is completed.
- On completing the data transmission:
On the superimposed display, a message “Save Complete” or “Load Complete” will be displayed.
In the menu display area, a message “SaveComp” or “LoadComp” will be displayed.

(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation

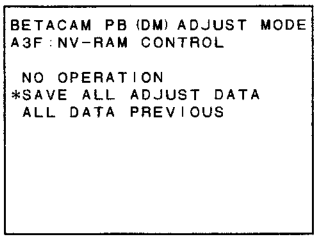
(In data save)

Superimposed display



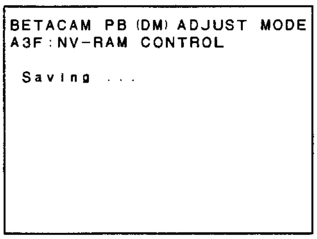
```
BETACAM PB (DM) ADJUST MODE
A3F : NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(1) ⇩ MULTI CONTROL



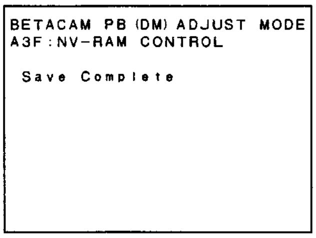
```
BETACAM PB (DM) ADJUST MODE
A3F : NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(2) ⇩ F5 (SET)



```
BETACAM PB (DM) ADJUST MODE
A3F : NV-RAM CONTROL

 Saving ...
```

⇩



```
BETACAM PB (DM) ADJUST MODE
A3F : NV-RAM CONTROL

 Save Complete
```

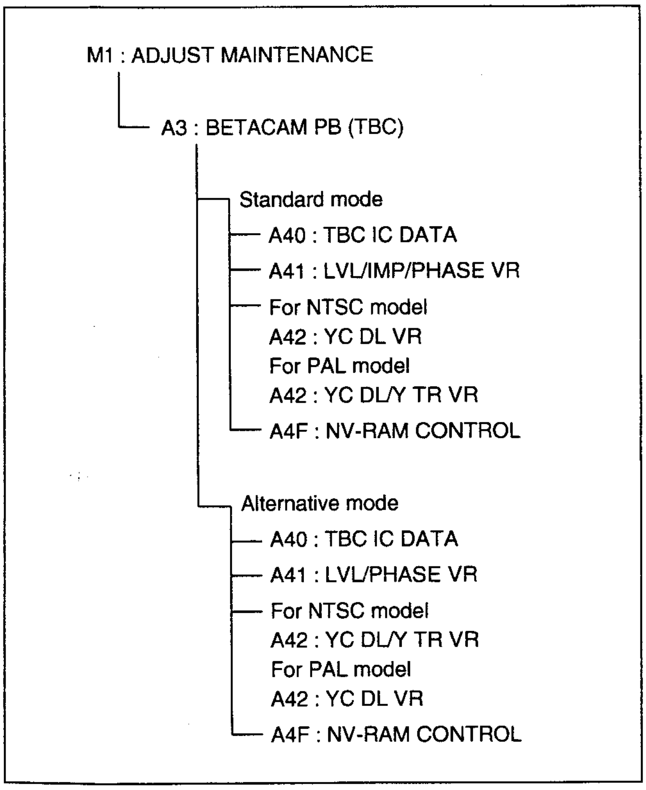
(3) ⇩ Check
(4) ⇩ F6 (EXIT)

3-3-6. BETACAM PB (TBC) Adjustment Mode (A4)

The A4 : BETACAM PB (TBC) mode is used to adjust the TBC for a Betacam/Betacam SP format.
In the standard and alternative modes, the menu items differ.

Standard : The NTSC model plays back in the 525 mode, or the PAL model plays back in the 625 mode.

Alternative : The NTSC model plays back in the 625 mode, or the PAL model plays back in the 525 mode.


M1 : ADJUST MAINTENANCE
A3 : BETACAM PB (TBC)
Standard mode
A40 : TBC IC DATA
A41 : LVL/IMP/PHASE VR
For NTSC model
A42 : YC DL VR
For PAL model
A42 : YC DL/Y TR VR
A4F : NV-RAM CONTROL
Alternative mode
A40 : TBC IC DATA
A41 : LVL/PHASE VR
For NTSC model
A42 : YC DL/Y TR VR
For PAL model
A42 : YC DL VR
A4F : NV-RAM CONTROL

Menu Tree of BETACAM PB (TBC) Adjustment Mode

CAUTION

Do not change the adjustment data carelessly. This may cause a trouble. For the actual adjustment, refer to the adjustment method described in Section 8 Electrical Alignment.
If you have changed the adjustment data carelessly, execute ALL DATA PREVIOUS in A4F : NV-RAM CONTROL menu or turn off the power of this unit without selecting A4F : NV-RAM CONTROL menu.
Never execute SAVE ALL ADJUST DATA.

To change the adjustment data manually

(1) When seeing superimposed display, turn the MULTI CONTROL knob to set the * mark to the item to be adjusted.
When seeing the menu display area, turn the search dial to display the item to be adjusted.

(2) To increase or decrease the adjustment data, turn the MULTI CONTROL knob while pressing the HOME button.

To return the adjustment data to the former state

Execute ALL DATA PREVIOUS in A4F : NV-RAM CONTROL menu.

Note

The current adjustment data can not return to the former state after executing SAVE ALL ADJUST DATA.

To save the adjustment data

Execute SAVE ALL ADJUST DATA in A4F : NV-RAM CONTROL menu.

Standard A40 : TBC IC DATA

```
BETACAM PB (TBC) ADJUST MODE
A40:TBC IC DATA

*SQ-Y RZ                 4B
 SQ-C RZ                 6F
 VISC PHASE              06
```

Alternative A40 : TBC IC DATA

```
BETACAM PB (TBC) ADJUST MODE
A40:TBC IC DATA

*SQ-Y RZ                 4B
 SQ-C RZ                 6F
```

- "SQ-Y RZ" and "SQ-C RZ" are used to adjust each read clock timing of Y and C signals of the TBC block.
- "VISC PHASE" is used to set the phase detection data for the playback VISC phase detection circuit.

Standard A41 : LVL/IMP/PHASE VR

```
BETACAM PB (TBC) ADJUST MODE
A41:LVL/PHASE VR

*AD LEVEL METAL-Y      7E
 AD LEVEL METAL-C      55
 AD LEVEL OXIDE-Y      07
 AD LEVEL OXIDE-C      55
 IMP OFFSET-Y          55
 IMP OFFSET-C          55
 VIDEO PH              55
 VISC PH               55
```

Alternative A41 : LVL/PHASE VR

```
BETACAM PB (TBC) ADJUST MODE
A41:LVL/PHASE VR

*AD LEVEL METAL-Y      7E
 AD LEVEL METAL-C      55
 AD LEVEL OXIDE-Y      07
 AD LEVEL OXIDE-C      55
 VIDEO PH              55
```

- "AD LEVEL" is used to adjust the input signal level of the AD converter of the TBC.
- "IMP OFFSET" is used to adjust the impact error offset.
- "VIDEO PH" is used to adjust the video phase.
- "VISC PH" is used for a fine adjustment of the VISC phase.

NTSC model : Standard

PAL model : Alternative

A42 : YC DL VR

```
BETACAM PB (TBC) ADJUST MODE
A42:YC DL VR

*Y/C DELAY M-A         7E
 Y/C DELAY M-B         55
 Y/C DELAY O-A         55
 Y/C DELAY O-B         55
```

NTSC model : Alternative

PAL model : Standard

A42 : YC DL/Y TR VR

```
BETACAM PB (TBC) ADJUST MODE
A42:YC DL/Y TR VR

*Y/C DELAY M-A         7E
 Y/C DELAY M-B         55
 Y/C DELAY O-A         55
 Y/C DELAY O-B         55
 Y TR OFFSET           55
```

- "Y/C DELAY" is used to adjust the delay of Y and C signals.
- "Y TR OFFSET" is used to adjust the tracking offset that controls the picture position in the shuttle mode to center of the screen.
  Adjust only in the following mode.
  NTSC model : Alternative
  PAL model : Standard

A4F : NV-RAM CONTROL

This menu is used to save the adjustment data adjusted in the A4 : BETACAM PB (TBC) mode into the NV-RAM. The current adjustment data can return to the former saved data before adjustment when executing "ALL DATA PREVIOUS" without saving the adjustment data into the NV-RAM.

Note

When the power is turned off without saving the adjusted data, the adjustment data returns to the former saved data.

To execute the menu

(1) Turn the MULTI CONTROL knob to set the ＊ mark on the superimposed display as described below.
  To save the adjustment data after adjustment:
  ⇨ "SAVE ALL ADJUST DATA"
  To return to the adjustment data before adjustment:
  ⇨ "ALL DATA PREVIOUS"
  - In the menu display area, a message "Save" or "PREVIOUS" will be displayed, respectively.

(2) Press the F5 (SET) button once.
  - On pressing it, the data transmission is initiated.
  - A message "Saving ..." or "Loading ..." will be displayed.

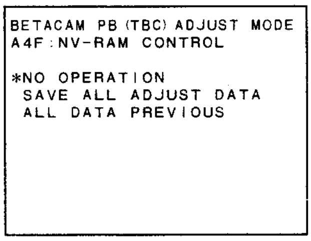
(3) Check that the data transmission is completed.
  - On completing the data transmission:
    On the superimposed display, a message "Save Complete" or "Load Complete" will be displayed.
    In the menu display area, a message "SaveComp" or "LoadComp" will be displayed.

(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation

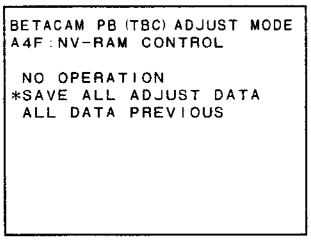
(In data save)

Superimposed display



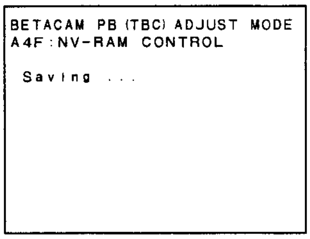
```
BETACAM PB (TBC) ADJUST MODE
A4F : NV-RAM CONTROL

*NO OPERATION
 SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(1) ⇩ MULTI CONTROL



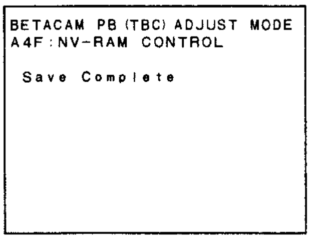
```
BETACAM PB (TBC) ADJUST MODE
A4F : NV-RAM CONTROL

 NO OPERATION
*SAVE ALL ADJUST DATA
 ALL DATA PREVIOUS
```

(2) ⇩ F5 (SET)



```
BETACAM PB (TBC) ADJUST MODE
A4F : NV-RAM CONTROL

 Saving ...
```

⇩



```
BETACAM PB (TBC) ADJUST MODE
A4F : NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check
(4) ⇩ F6 (EXIT)

3-3-7. LTC REC Mode (A6) (For Player)

A6 : LTC REC mode is exclusive for the player and used to record the LTC when adjusting the shot mark recording circuit.

To execute

(1) Insert the cassette tape recorded by the tape format able to play back.
- The message "Record start (Push SET)" is displayed on the superimposed display.
  The message "PUSH SET" is displayed on the time data display area.

Notes
- Use the cassette tape of the same video mode (525/625) as the unit which is adjusted.
- Check that the remainder of a cassette tape have enough amount.

(2) Press the F5 (SET) button.
- The recording starts automatically and the REC/ERASE indicator illuminates.
- The message "Recording" is displayed on the super imposed display.

Note

The message "Insert Tape" is displayed when the cassette tape is not inserted in this unit. The recording starts automatically when the cassette tape is inserted. The time data display area displays an ordinary time counter

(3) Perform the adjustment. (Refer to Section 8-10.)

Note

When the cassette tape has ended during adjusting, the recording stops and the cassette tape is automatically rewound.
When restarting the adjustment, press the F6(SET) button after pressing the F6 (MENU) button once to display the message "Record start (PUSH SET)" on the superimposed display.

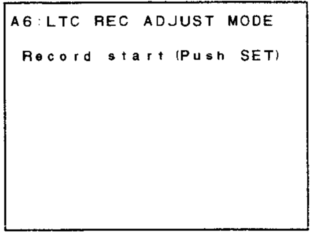
(4) Press the STOP button after completing the adjustment.
- The message "Record stop" is displayed on the superimposed display.

(5) Eject the cassette tape.

(6) Press the F6 (SET) button twice to exit A6:LTC REC mode.

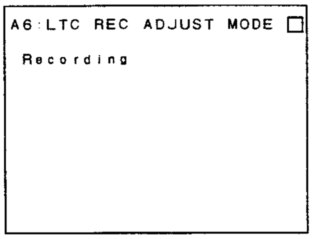
Example of display and operation

Superimposed display



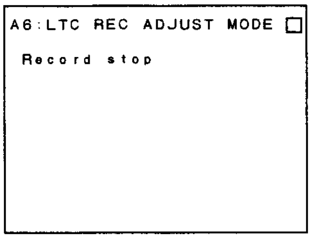
```
A6:LTC REC ADJUST MODE
 Record start (Push SET)
```

(1) ⇩ Insert a recorded tape
(2) ⇩ F5(SET)



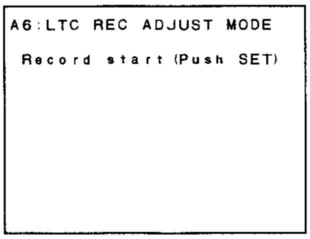
```
A6:LTC REC ADJUST MODE □
 Recording
```

(3) ⇩ Adjust
(4) ⇩ STOP



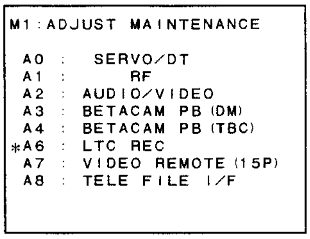
```
A6:LTC REC ADJUST MODE □
 Record stop
```

(5) ⇩ EJECT
(6) ⇩ F6(EXIT)



```
A6:LTC REC ADJUST MODE
 Record start (Push SET)
```

⇩ F6(EXIT)



```
M1:ADJUST MAINTENANCE
 A0 :  SERVO/DT
 A1 :    RF
 A2 : AUDIO/VIDEO
 A3 : BETACAM PB (DM)
 A4 : BETACAM PB (TBC)
*A6 : LTC REC
 A7 : VIDEO REMOTE (15P)
 A8 : TELE FILE I/F
```

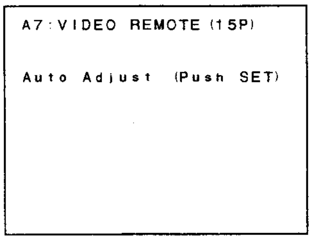
3-3-8. VIDEO REMOTE (15P) Adjustment Menu (A7)

This is used to write the input voltage level of the VIDEO CONTROL connector (15 pin) to the NV-RAM. The voltage to be written is equal to the voltage to set the video output to the preset value (UNITY).

To execute the menu

(1) Connect nothing to the VIDEO CONTROL connector.
(2) Select menu A7 : VIDEO REMOTE (15P).
(3) Press F5 (SET) button once.
   - On pressing it, the data writing is initiated.
   - A message "Saving..." will be displayed during writing.
   - On completing the writing, a message "Save Complete" will be displayed on the superimposed display.
   - When the writing does not performed normally, "Save Incomplete" will be displayed.
(4) Check to see that "Save Complete" is displayed.
(5) To exit the menu, press the F6 (EXIT) button once.

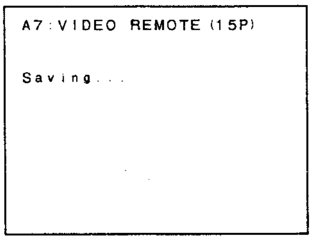
Example of display and operation



A7:VIDEO REMOTE (15P)

Auto Adjust (Push SET)

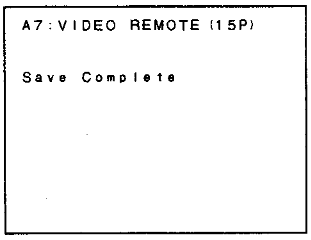
(3) ⇩ F5(SET)



A7:VIDEO REMOTE (15P)

Saving...

⇩



A7:VIDEO REMOTE (15P)

Save Complete

(4) ⇩ Check
(5) ⇩ F6(EXIT)

3-3-9. TELE-FILE I/F Adjustment Menu (A8)

Menu for supplying power to the Tele-File circuit during Tele-File adjustment.

To energize the Tele-File circuit

(1) Select A8 : TELE-FILE I/F.

(2) Rotate the MULTI CONTROL knob while pressing the HOME button to display "ON".

(3) Press the F5 (SET) button.

- Pressing the F5 (SET) button supplies power to the Tele-File circuit.

Note

When executed with the cassette tape inserted, "EJECT..." will be displayed, then the cassette tape will be ejected.

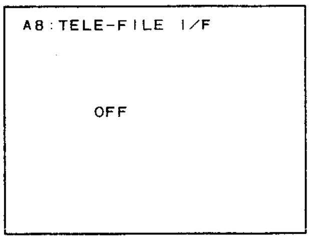
After that, the display will become "ON" and power will be supplied to the Tele-File circuit.

(4) Perform the Tele-File adjustment. (Refer to Section 8-11.)

(5) After completing adjustment, press the F6 (EXIT) button to exit the menu.

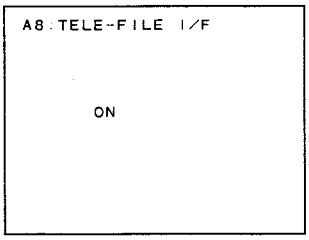
- The power of the Tele-File circuit will also be turned off again (normal operations).

Example of display and operation



```
A8 : TELE-FILE I/F

    OFF
```

(2) ⇩ HOME + MULTI CONTROL



```
A8 : TELE-FILE I/F

    ON
```

(3) ⇩ F5 (SET)

(4) ⇩ Tele-File ON (Adjustment)

(5) ⇩ F6 (EXIT)

3-4. Error Logger Display Mode (M2)

3-4-1. Outline

This unit has an error log function that records the error generated or detected in this unit.
The error logger display mode is used to superimpose the contents (data) of the error log on the video monitor. The ordinary display mode (refer to Section 3-4-2) and the setting mode (refer to Section 3-4-3) that displays the menu to limit the error log display are available in this unit.
The calendar/clock incorporated into this unit can be set in the setting mode.

Activation and Termination

The two methods below are used to activate the error logger display mode.

A. Select the M2 : ERROR LOGGER menu in the maintenance mode, then press the F5 (SET) button.
B. Press the F5 (MENU) button while pressing the ENTRY button on the lower control panel during ordinary operation.

To terminate the error logger display mode, press the F6 (EXIT) button in the display mode. The unit returns to the operation state before activation of the error logger display mode.

Error Log

The recorded error log is classified into three categories: TAPE ERROR, WARNING, and CONDITION. (The error log belongs to the three types.)
Each log is constituted of a message, error occurrence date, and time code.
The message varies depending on the type of a log.
The error occurrence date is the date based on the calendar and clock in this unit. (The year is omitted.)
The time code is the time code (LTC) data of the VTR side which is stored in this unit at the error occurrence.

The maximum number of stored log is 100. If the number of log exceeds 100, the contents of oldest error log is erased sequentially.

TAPE ERROR

An error code and error message are recorded as a message when the error (error codes 01 to 99) related to a VTR and system occurs.
When multiple sub-error messages are displayed, the three sub-error messages from the top are recorded.
For the error message, refer to Section 2.

WARNING

The warning log below is recorded in an error log.

- REFERENCE MISSING
  This message is recorded when no signal is input to the REF VIDEO (reference video signal) connector when the power is turned on.

CONDITION

The condition logs below are recorded in an error log.

- VIDEO PB CONDITION RED (for DVW/MSW series), or V PB DATA ERROR (for HDW series)
  This message is recorded when the channel condition becomes red during video PB operation.
- AUDIO PB CONDITION RED (for DVW/MSW series), or A PB DATA ERROR (for HDW series)
  This message is recorded when the channel condition becomes red during audio PB operation.

3-4-2. Display Mode

The operation in the ordinary display mode is described based on a display example on the superimposed display.
The log number/total log count is displayed in the second line. "(001/000)" is displayed when no log exists.
The third to tenth lines (eight lines) are the area where logs are displayed. The three-digit number on the left indicates the log number. The contents of a log are displayed on its right.
A calendar/clock (year, month, day, hour, minute and second) is displayed on the lowest line.

Note

The top screen on the right is the example displayed when the error logger mode is first activated after the power is turned on. The second-time or later screen displays the state when the preceding display completed.

MULTI CONTROL knob

To display the log number not displayed on the screen, turn the MULTI CONTROL knob and move the * mark.

F1 (ERROR) button

To display the log number and the log name, press the F1 (ERROR) button.

F2 (DATE) button

To display the log number and the date and time when the log occured, press the F2 (DATE) button.

F3 (TC) button

To display the log number and the time code where the log occured, press the F3 (TC) button.

F4 (DETAIL) button

To display the log number and the log's whole information, press the F4 (DETAIL) button.

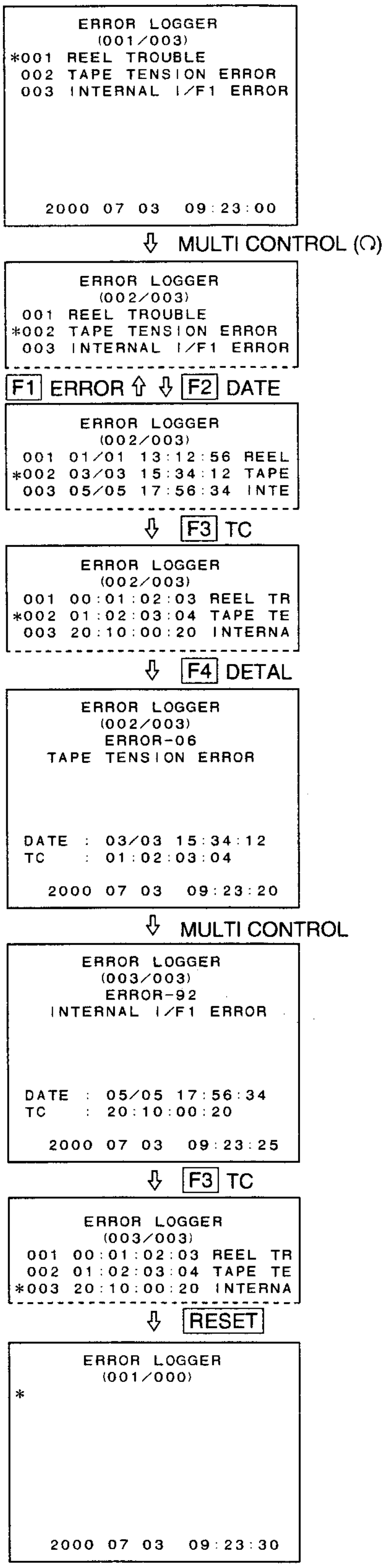
RESET button

The recorded all logs are erased when the RESET button is pressed.

CAUTION

Usually, do not erase any log.
There may be some error logs that are useful for confirmation of the progress when a trouble occurs or that are important in preventing a trouble from occurrence.

Example of display and operation



```
        ERROR LOGGER
          (001/003)
*001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR



   2000 07 03   09:23:00
```

⇩ MULTI CONTROL (↻)

```
        ERROR LOGGER
          (002/003)
 001 REEL TROUBLE
*002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
```

F1 ERROR ⇧ ⇩ F2 DATE

```
        ERROR LOGGER
          (002/003)
 001 01/01 13:12:56 REEL
*002 03/03 15:34:12 TAPE
 003 05/05 17:56:34 INTE
```

⇩ F3 TC

```
        ERROR LOGGER
          (002/003)
 001 00:01:02:03 REEL TR
*002 01:02:03:04 TAPE TE
 003 20:10:00:20 INTERNA
```

⇩ F4 DETAL

```
        ERROR LOGGER
          (002/003)
          ERROR-06
   TAPE TENSION ERROR


 DATE  :  03/03 15:34:12
 TC    :  01:02:03:04

   2000 07 03   09:23:20
```

⇩ MULTI CONTROL

```
        ERROR LOGGER
          (003/003)
          ERROR-92
   INTERNAL I/F1 ERROR


 DATE  :  05/05 17:56:34
 TC    :  20:10:00:20

   2000 07 03   09:23:25
```

⇩ F3 TC

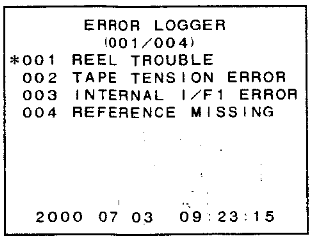
```
        ERROR LOGGER
          (003/003)
 001 00:01:02:03 REEL TR
 002 01:02:03:04 TAPE TE
*003 20:10:00:20 INTERNA
```

⇩ RESET

```
        ERROR LOGGER
          (001/000)
*




   2000 07 03   09:23:30
```

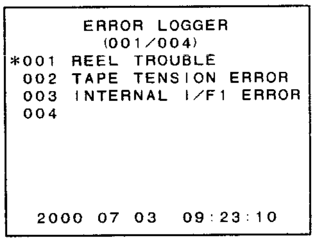
Limited-display screen

For the error log of the category that is set to OFF in the menu of setting mode (refer to Section 3-4-3), information items other than a log number are not displayed. However, the whole display using the F4 (DETAIL) button is not influenced by the setting.



```
       ERROR LOGGER
        (001/004)
*001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
 004 REFERENCE MISSING



 2000 07 03  09:23:15
```

Ordinary Screen
(No limited-display)



```
       ERROR LOGGER
        (001/004)
*001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
 004



 2000 07 03  09:23:10
```

Only WARNING Turned Off

3-4-3. Setting Mode

The setting mode is used to display a menu that limits the display of an error log. In this menu, the display can be turned on and off for each error log category. A calendar/ clock can also be set in this menu.

Note

The top and second screens on the right are the examples displayed when the error logger mode and setting mode are first activated after the power is turned on. The second-time or later screen displays the state when the preceding display completed.

Entering the setting mode

Press the F5 (SET) button in the display mode.

Returning to the display mode

Press the F5 (SET) button.

Setting menu

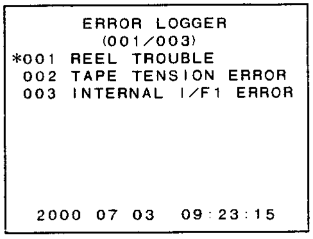
The seventh to ninth lines on the superimposed display are the error log setting menu. The display in the display mode is left in the first to fifth lines.
Each setting when the power is turned on is all ON.
The error log belonging to the category set to OFF is limited in display. (Refer to the "Limited-display screen" on the previous page.)
The changed setting is valid until the power is turned off.
How to change the setting is described below.

(1) Press F1 (PREV) or F2 (NEXT) button to set the * mark to the category to be changed in setting.
(2) To change the setting, turn the MULTI CONTROL knob.
ON ⇨ OFF : MULTI CONTROL knob (↺)
OFF ⇨ ON : MULTI CONTROL knob (↻)
(3) To change the setting of other categories, repeat steps (1) and (2).
(4) To finish the setting mode, press the F6 (EXIT) button once.

The 10th line on the superimposed display is the time zone setting menu.
UMID is correctly generated by setting the local time and the time zone (time difference between the local time and Coordinated Universal Time (UTC)) into the built-in calendar/clock.
For details, refer to "UMID Function" in the Operation Manual.

Example of display and operation

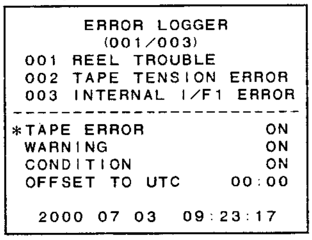
Display Mode



```
        ERROR LOGGER
         (001/003)
*001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR





  2000 07 03   09:23:15
```

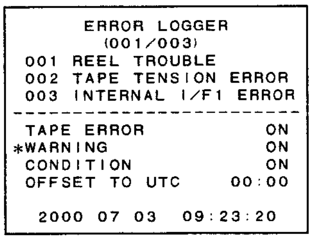
F6 EXIT ⇧ ⇩ F5 SETTING

Setting Mode



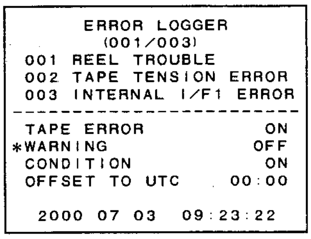
```
        ERROR LOGGER
         (001/003)
 001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
--------------------------
*TAPE ERROR             ON
 WARNING                ON
 CONDITION              ON
 OFFSET TO UTC       00:00

  2000 07 03   09:23:17
```

⇩ F1 PREV or F2 NEXT



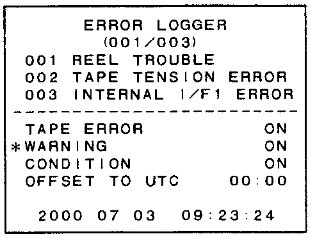
```
        ERROR LOGGER
         (001/003)
 001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
--------------------------
 TAPE ERROR             ON
*WARNING                ON
 CONDITION              ON
 OFFSET TO UTC       00:00

  2000 07 03   09:23:20
```

⇩ MULTI CONTROL



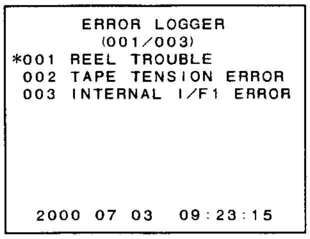
```
        ERROR LOGGER
         (001/003)
 001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
--------------------------
 TAPE ERROR             ON
*WARNING               OFF
 CONDITION              ON
 OFFSET TO UTC       00:00

  2000 07 03   09:23:22
```

⇩ MULTI CONTROL



```
        ERROR LOGGER
         (001/003)
 001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR
--------------------------
 TAPE ERROR             ON
*WARNING                ON
 CONDITION              ON
 OFFSET TO UTC       00:00

  2000 07 03   09:23:24
```

⇩ F6 EXIT



```
        ERROR LOGGER
         (001/003)
*001 REEL TROUBLE
 002 TAPE TENSION ERROR
 003 INTERNAL I/F1 ERROR





  2000 07 03   09:23:15
```

Calendar/clock setting

The calendar/clock's date and time of this unit can be adjusted in the setting mode as described below.
In a display/operation example on the right, 9:23 of July 3rd in 2000 is set to 15:00 of August 1st in 2000.

(1) Press the F1 (PREV) or F2 (NEXT) button to blink the numerical value (year, month, day, hour, minute, or second) of the calendar/clock item to be changed.

(2) Press the F3 (−) or F4 (+) button or turn the MULTI CONTROL knob to change the numerical value to the desired one.

Notes

- The changing value stops counting until saving the setting.
- On the superimposed display, a message "Push SET button" is displayed.

(3) Repeat steps (1) and (2) until the numerical values in other items are changed completely.

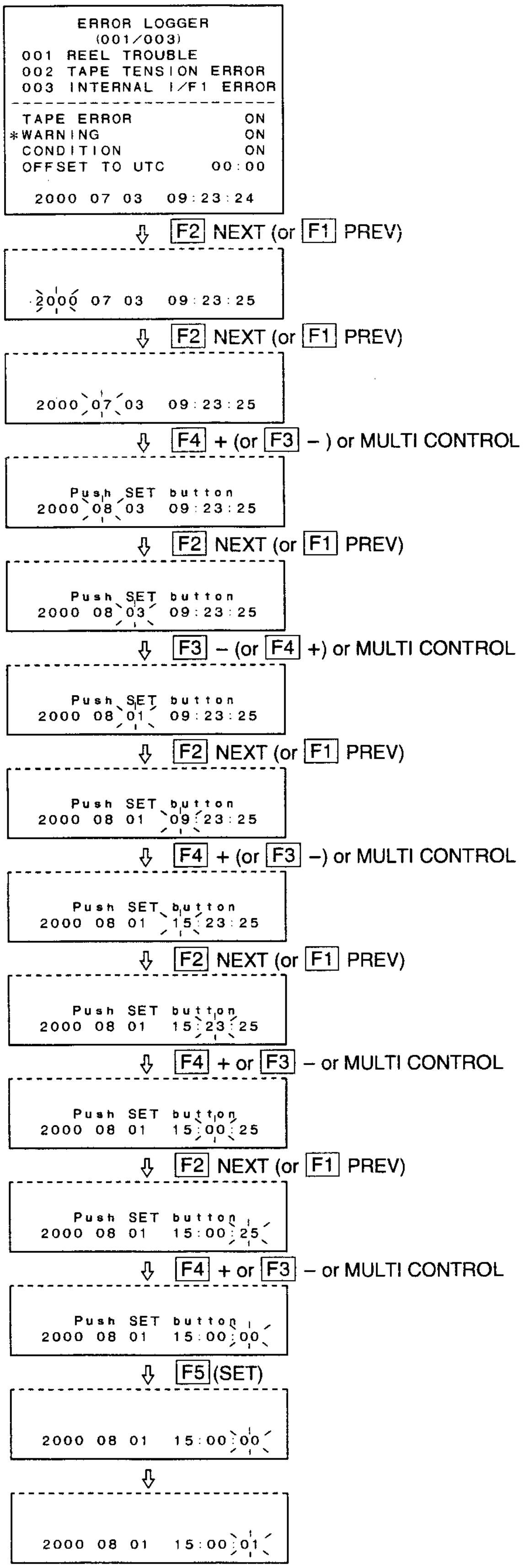
(4) Press the F5 (SET) button to save the setting values.

Note

To set the time accurately, the moment the display and current time coincided, press the F5 (SET) button.

(5) To exit the setting mode, press the F6 (EXIT) button once.

Example of display and operation



```
         ERROR LOGGER
           (001/003)
001 REEL TROUBLE
002 TAPE TENSION ERROR
003 INTERNAL I/F1 ERROR
---------------------------
TAPE ERROR               ON
*WARNING                 ON
CONDITION                ON
OFFSET TO UTC         00:00

2000 07 03   09:23:24
```

⇩ F2 NEXT (or F1 PREV)

```
2000 07 03   09:23:25
```

⇩ F2 NEXT (or F1 PREV)

```
2000 07 03   09:23:25
```

⇩ F4 + (or F3 −) or MULTI CONTROL

```
     Push SET button
2000 08 03   09:23:25
```

⇩ F2 NEXT (or F1 PREV)

```
     Push SET button
2000 08 03   09:23:25
```

⇩ F3 − (or F4 +) or MULTI CONTROL

```
     Push SET button
2000 08 01   09:23:25
```

⇩ F2 NEXT (or F1 PREV)

```
     Push SET button
2000 08 01   09:23:25
```

⇩ F4 + (or F3 −) or MULTI CONTROL

```
     Push SET button
2000 08 01   15:23:25
```

⇩ F2 NEXT (or F1 PREV)

```
     Push SET button
2000 08 01   15:23:25
```

⇩ F4 + or F3 − or MULTI CONTROL

```
     Push SET button
2000 08 01   15:00:25
```

⇩ F2 NEXT (or F1 PREV)

```
     Push SET button
2000 08 01   15:00:25
```

⇩ F4 + or F3 − or MULTI CONTROL

```
     Push SET button
2000 08 01   15:00:00
```

⇩ F5 (SET)

```
2000 08 01   15:00:00
```

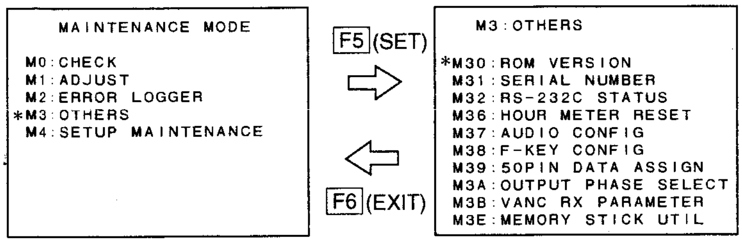
⇩

```
2000 08 01   15:00:01
```

3-5. OTHERS Mode (M3)

3-5-1. Outline

The OTHERS mode is used for other checks and setting.



```
 MAINTENANCE MODE

 M0:CHECK
 M1:ADJUST
 M2:ERROR LOGGER
*M3:OTHERS
 M4:SETUP MAINTENANCE
```

```
 M3:OTHERS

*M30:ROM VERSION
 M31:SERIAL NUMBER
 M32:RS-232C STATUS
 M36:HOUR METER RESET
 M37:AUDIO CONFIG
 M38:F-KEY CONFIG
 M39:50PIN DATA ASSIGN
 M3A:OUTPUT PHASE SELECT
 M3B:VANC RX PARAMETER
 M3E:MEMORY STICK UTIL
```

MAINTENANCE Mode **OTHERS Mode**

Title	Page	Description
M30 : ROM VERSION	3-131	Displays the unit's model name, ROM version, and optionally installed board.
M31 : SERIAL NUMBER	3-131	Displays and corrects the serial number of this unit.
M32 : RS-232C STATUS	3-132	Displays the interface communication state of an RS-232C connector.
M36 : HOUR METER RESET	3-133	Displays and resets the resettable hours meter and thread counter.
M37 : AUDIO CONFIG	3-133	Sets the audio system configuration.
M370 : METER HEAD ROOM	3-133	Sets the head room of an audio level meter.
M371 : DATA LENGTH	3-134	Sets the audio channel configuration and data length.
M372 : NON-AUDIO INPUT	3-134	(Exclusive for recorder) Selects the audio data or non-audio data to be recorded on the audio track
M38 : F-KEY CONFIG	3-135	Sets the function key configuration.
M380 : HOME2	3-135	Assigns the function keys of HOME2 page
M381 : PAGE6 ASSIGN	3-137	Assigns the desired items of the setup menu to PAGE6.
M382 : PAGE6 NAME	3-139	Set the desired name to the items assigned to PAGE6.
M38F : NV-RAM CONTROL	3-140	Save the setting data.
M39 : 50PIN DATA ASSIGN	3-141	Sets the 50-pin parallel remote interface.
M390 : INPUT PIN ASSIGN	3-141	Sets the data of input pins.
M391 : OUTPUT PIN ASSIGN	3-142	Sets the data of output pins.
M392 : NV-RAM CONTROL	3-143	Saves the setting data.
M3A : OUTPUT PHASE SELECT	3-144	Sets the phase of HD SDI and SD video output signals.
M3A0 : HD PHASE SEL	3-144	(Exclusive for HDW series) Sets the phase of HD SDI video output signal.
M3A1 : SD PHASE SEL	3-144	Sets the phase of SD video output signal.
M3A2 : SD UPCONV SEL	3-144	(Exclusive for HDW series) Sets the phase of SD video output signal during SD tape playback.
HD PHASE SEL	3-144	(Exclusive for BKMW-104) Sets the phase of HD and SD video output signals at upconverter using.
M3B : VANC RX PARAMETER	3-146	(Exclusive for HDW series) Sets the RX parameter of HD SDI ANC data.
LINE1	3-146	Sets the line number (odd field) on the HD SDI with which the V-ANC to receive is inserted.
LINE2	3-146	Sets the line number (even field) on the HD SDI with which the V-ANC to receive is inserted.
DID	3-146	Sets the DID of the V-ANC to receive.
SDID	3-146	Sets the SDID of the V-ANC to receive.

3-5-1. Outline

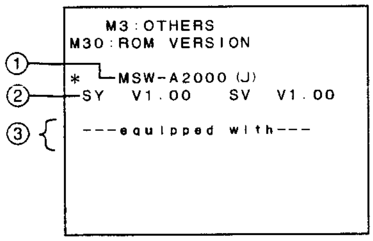
Title	Page	Description
M3E : MEMORY STICK UTIL	3-147	Uploads and downloads the software using the Memory Stick.
M3E0 : STICK TO ROM	3-147	Loads the data in a Memory Stick to the ROMs in the unit.
M3E1 : ROM TO STICK	3-150	Loads the ROM data in the unit to a Memory Stick.
M3E2 : FORMAT STICK	3-151	Formatting of a Memory Stick.
M3F : MEMORY CARD UTILITY	3-152	Uploads and downloads the software using the memory card.
M3F0 : CARD TO ROM	—	Loads the data in a memory card to the ROMs in the unit.
M3F1 : ROM TO CARD	—	Loads the ROM data in the unit to a memory card.
M3F2 : FORMAT CARD	—	Formatting of a memory card.

Notes

- M371 : DATA LENGTH is displayed in MSW series only.
- M3B : VANC RX PARAMETER is not displayed in SY ROM version up to 3.00 of HDW series.

3-5-2. ROM VERSION Display Menu (M30)

This menu displays the model name of this unit, the destination, the ROM version, and the information of the installed option.



```
      M3 : OTHERS
M30 : ROM  VERSION

*  └MSW-A2000 (J)
  SY   V1.00    SV   V1.00

  ---equipped with---
```

Description of superimposed display

① The model name of this unit and the destination in parentheses are displayed.
They are detected from the setting condition of the DIP switch (S1501) on the SS-89 board.

② Each version number of a system control ROM (SY) and a servo ROM (SV) is displayed.

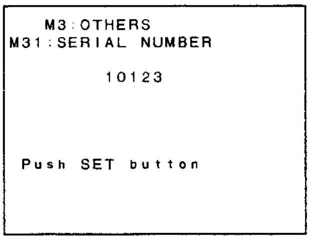
③ The installed option is displayed.

Menu operation

Turn the MULTI CONTROL knob to move the * mark.
The contents of the *-marked item on the superimposed display are displayed in the menu display area also.
The installed option is displayed on only the superimposed display.

3-5-3. SERIAL NUMBER Display Menu (M31)

This menu displays the serial number of this unit. When the serial number does not coincide because of repair, it can be set again in this menu.



```
      M3 : OTHERS
M31 : SERIAL  NUMBER

         10123



  Push  SET  button
```

CAUTION

- Set the serial number again after the DR-414/508 board or the NV-RAM (IC101 on the DR-414/508 board) is replaced.

Note

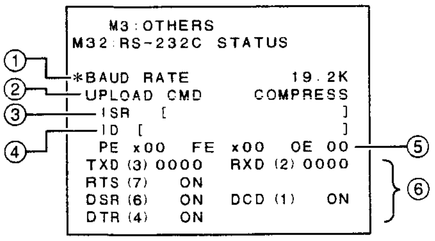
- "------" is displayed in the state where no serial number is set.

Serial number setting

(1) Turn the MULTI CONTROL knob to blink the digit you wish to set.
(2) Turn the MULTI CONTROL knob while pressing the HOME button to change the digit number.
   - On changing the setting, a message "Push SET Button" will be displayed on the superimposed display.
   - To cancel the setting, press the F6 (EXIT) button to terminate this menu.
(3) Repeat steps (1) and (2) for each digit.
(4) Press the F5 (SET) button to save the set serial number.
   - On pressing, a message "Saving..." will be displayed. If no abnormality is found, the display changes to "Save Complete" after a few seconds. To turn off "Save Complete", turn the MULTI CONTROL knob.

3-5-4. RS-232C STATUS Display Menu (M32)

This menu displays the communication state of an RS-232C interface. The communication baud rate also can be changed in this menu.



```
    M3:OTHERS
M32:RS-232C STATUS

*BAUD RATE          19.2K
 UPLOAD CMD      COMPRESS
  ISR  [                 ]
  ID [                   ]
  PE x00  FE x00   OE 00
 TXD (3) 0000  RXD (2) 0000
 RTS (7)   ON
 DSR (6)   ON  DCD (1)   ON
 DTR (4)   ON
```

Description of superimposed display

① The communication baud rate is displayed. The baud rate can be selected from among the followings. (The factory setting is 19.2 K.)
1200, 2400, 4800, 9600, 19.2K (bps)

② Displays the data format in uploading. Compress (factory setting) or Uncompress is selectable.

③ The status of an ISR protocol is displayed.
ISR x [yyyy. . . . .]
ⓐ ⓑ

ⓐ Displays the protocol status of this unit.

A:	ACK sending
N:	NAK sending
T:	ATN (OPC or QRESP) sending
W:	ACK waiting
X:	XOFF receive, XON waiting

ⓑ Displays the last ISR command that was received properly. The preceding command is displayed until ACK transmission is completed.

If no object for communication is connected to the RS-232C connector, items ⓐ and ⓑ become blank.

④ The device ID is displayed. The device ID is set using the DEVICE command of the ISR protocol. This setting is maintained (even if the power is turned off) until it is changed by the DEVICE command. The device ID becomes blank when it is not set.

⑤ The number of errors below that occurred during receiving is displayed.

PE :	Parity error
FE :	Framing error
OE :	Overrun error

If no object for communication is connected to the RS-232C connector, each error is not displayed as a time count, but as "00".

⑥ The numeral number in parentheses is the pin number of the RS-232C connector.
TXD/RXD displays the number of data (number of bytes) properly sent/received in this unit in four digits (hexadecimal).
Others display the connection state of the RS-232C connector in "ON" (+3 V or more) and "OFF" (−3 V or less).
When the object for communication is connected to the RS-232C connector, they display as "ON". If no object for communication is connected to the RS-232C connector, the TXD and RXD are displayed as "0000" and the DSR and DCD become undefined state.

Setting of communication baud rate

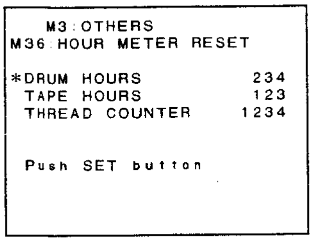
(1) Turn the MULTI CONTROL knob to move * to BAUD RATE.
(2) Turn the MULTI CONTROL knob while pressing the HOME button and display the desired baud rate.
  - On changing the setting, a message "Push SET Button" will be displayed on the superimposed display.
  - To cancel the setting, press the F6 (EXIT) button to terminate this menu.
(3) Press the F5 (SET) button to save the setting.
  - On pressing, a message "Saving ..." will be displayed on the superimposed display. If no abnormality is found, the display changes to "Save Complete" after a few seconds.
    To turn off "Save Complete", turn the MULTI CONTROL knob.

Setting of data format in uploading

(1) Turn the MULTI CONTROL knob to move * to UPLOAD CMD.
(2) Turn the MULTI CONTROL knob while pressing the HOME button and display the desired data format.
  - On changing the setting, a message "Push SET Button" will be displayed on the superimposed display.
  - To cancel the setting, press the F6 (EXIT) button to terminate this menu.
(3) Press the F5 (SET) button to save the setting.
  - On pressing, a message "Saving ..." will be displayed on the superimposed display. If no abnormality is found, the display changes to "Save Complete" after a few seconds.
    To turn off "Save Complete", turn the MULTI CONTROL knob.

3-5-5. HOUR METER RESET Menu (M36)

This menu can display and reset the values of the resettable hours meter and thread counter.



```
    M3 : OTHERS
M36 HOUR METER RESET

*DRUM HOURS            234
 TAPE HOURS            123
 THREAD COUNTER       1234


 Push SET button
```

Description of superimposed display

DRUM HOURS : Indicates the total of drum rotation time. Same as in setup menu ITEM-H12.

TAPE HOURS : Indicates the total of tape transport time. Same as in setup menu ITEM-H13.

THREAD COUNTER : Indicates the total of threading count. Same as in setup menu ITEM-H14.

Menu operation

Turn the MULTI CONTROL knob to move the * mark. The contents of the *-marked line on the superimposed display are displayed in the menu display area also.

To reset

CAUTION

The former state cannot be returned to the former state when the F5 (SET) button is pressed for reset operation.

(1) Turn the MULTI CONTROL knob to move the * mark to the item to be reset.

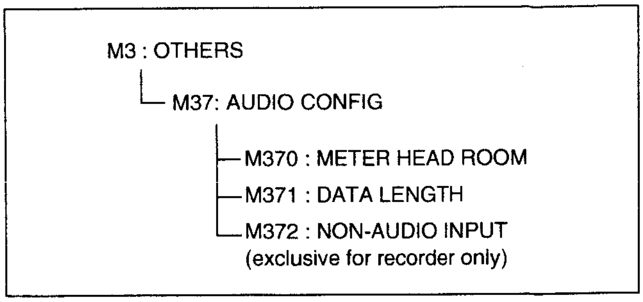
(2) Turn the MULTI CONTROL knob counterclockwise while pressing the HOME button to set the display value to 0.
- On setting the display value to 0, a message "Push SET Button" will be displayed on the superimposed display.
- To return to the former state, turn the MULTI CONTROL knob clockwise.

(3) If there are other items to be reset, repeat steps (1) and (2).

(4) Press the F5 (SET) button to save the reset data.
- On pressing, a message "Saving..." will be displayed. If no abnormality is found, the display changes to "Save Complete" after a few seconds. To turn off "Save Complete", turn the MULTI CONTROL knob.

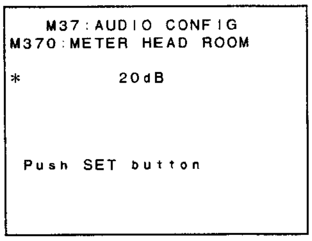
3-5-6. AUDIO CONFIG Mode (M37)

This mode is used to set the audio configuration.



Menu Tree of AUDIO CONFIG Mode

M370 : METER HEAD ROOM Setup Menu



```
    M37 : AUDIO CONFIG
M370 : METER HEAD ROOM

*           20dB



  Push SET button
```

This menu can change the head room setting of an audio level meter.

The head room can be selected from among the followings. (The factory setting is 20 dB.)

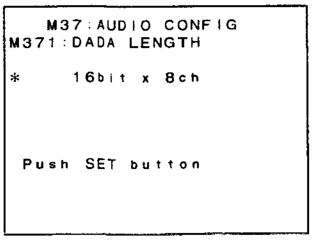
20 dB, 18 dB, 16 dB, 15 dB, 14 dB, 12 dB, 9 dB

Head room setting

(1) Turn the MULTI CONTROL knob while pressing the HOME button to display the desired setting.
- On changing the setting, a message "Push SET Button" will be displayed.
- To cancel the setting, press the F6 (EXIT) button to terminate this menu.

(2) Press the F5 (SET) button to save the changed setting.
- On pressing, a message "Saving..." will be displayed. If no abnormality is found, the display changes to "Save Complete" after a few seconds. To turn off "Save Complete", turn the MULTI CONTROL knob.

M371 : DATA LENGTH



```
  M37:AUDIO CONFIG
M371:DADA LENGTH
*     16bit x 8ch


 Push SET button
```

This menu is only displayed in MSW series.
This menu changes the data length and number of the audio channels.
They are selectable from the followings.

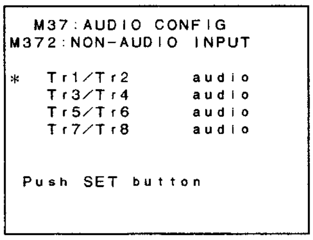
16 bit × 8 ch (factory setting)
24 bit × 4 ch

Data length setting

(1) Turn the MULTI CONTROL knob while pressing the HOME button to display the desired setting.
- On changing the setting, a message "Push SET Button" will be displayed.
- To cancel the setting, press the F6 (EXIT) button to terminate this menu.

(2) Press the F5 (SET) button to save the changed setting.
- On pressing, a message "Saving..." will be displayed. If no abnormality is found, the display changes to "Save Complete" after a few seconds.

M372 : NON-AUDIO INPUT



```
  M37:AUDIO CONFIG
M372:NON-AUDIO INPUT

*   Tr1/Tr2        audio
    Tr3/Tr4        audio
    Tr5/Tr6        audio
    Tr7/Tr8        audio

 Push SET button
```

Note

Tr5/Tr6 and Tr7/Tr8 will not be displayed in the HDW series.

This menu is only displayed in recorder.
This menu sets the audio track on which non-audio data are recorded.
Set track 1 & 2, 3 & 4, 5* & 6* and 7* & 8*. "audio" is factory setting.

* : MSW series only

Notes

- Selectable settings differ between the DVW/MSW series and HDW series as follows.
  DVW/MSW series:
    audio: Normal audio signal
    data: Data signal
  HDW series:
    audio: Normal data signal
    burst: Burst type data signal such as Dolby-E
    cont: Continuous type data signal such as AC-3
- When any of the four or two pairs of audio tracks is set to "data", the audio input data is recorded without dither processing regardless of sett ing of setup menu ITEM-F35 : AUDIO DITHER.

Audio track setting

(1) Turn the MULTI CONTROL knob to select a pair of tracks to be set.

(2) Turn the MULTI CONTROL knob while pressing the HOME button to display the setting desired.
- On changing the setting, a message "Push SET Button" will be displayed.
- To cancel the setting, press the F6 (EXIT) button to exit this menu.

(3) Press the F5 (SET) button to save the changed setting.
- On pressing, a message "Saving..." will be displayed. If no abnormality is found, the display changes to "Save Complete" after a few seconds.

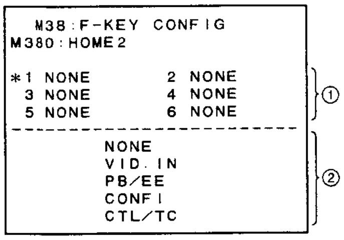
3-5-7. F-KEY CONFIG Mode (M38)

This mode is used for setting related to function keys (F1 through F6 buttons).

```
M3 : OTHERS
└─ M38 : F-KEY CONFIG
        ├─ M380 : HOME 2
        ├─ M381 : PAGE6 ASSIGN
        ├─ M382 : PAGE6 NAME
        └─ M38F : NV-RAM CONTROL
```

Menu Tree of F-KEY CONFIG Mode

M380 : HOME2



```
 M38:F-KEY  CONFIG
M380:HOME2

*1 NONE       2 NONE
 3 NONE       4 NONE
 5 NONE       6 NONE
--------------------------
       NONE
       VID. IN
       PB/EE
       CONF I
       CTL/TC
```

This menu is used to assign functions below to F1 through F6 buttons of HOME2 page.

Assignable functions in HOME2 page
- Function menus already set to function menu HOME1 and pages 1 through 4
- Status display of setup menu ITEM-221 : 9PIN REMOTE SW and function RMT1 whose setting is changeable

As to details of RMT1, refer to Operation Manual.

Description of superimposed display

① Area 1
The function names that are set to F1 through F6 buttons in function menu HOME2 page are displayed. When no function is set, NONE is displayed. (The factory setting is all NONE.)

② Area 2
The function names that can be set to F1 through F6 buttons in function menu HOME2 page are displayed in scroll.

To execute the setting

(1) Turn the MULTI CONTROL knob to move the * mark in area 1 to the F button number to be set.
- If the display of area 2 is scrolled, press the F6 (EXIT) button, then turn the MULTI CONTROL knob.

(2) Press the F5 (SET) button once to decide the F button to be set to.
- The function name in area 2 that is set to the selected F button blinks. If no function is set, NONE blinks.

(3) Turn the MULTI CONTROL knob to blink the function name to be set to the F button selected in step (1).
- Area 2 scrolls according to turning the MULTI CONTROL knob.

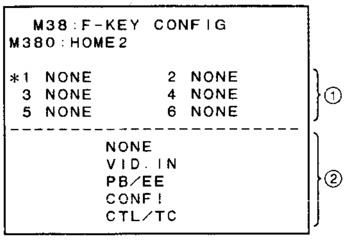
(4) Press the F5 (SET) button once to decide the function to be set.
- The blinking in area 2 stops. The function name of the F button in area 1 is changed to selected one in step (3).
- Here, if you turn the MULTI CONTROL knob and select other function and press the F5 (SET) button, the function set to the F button is changed again.

(5) Press the F6 (EXIT) button once.
- To set a function to other F buttons, repeat steps (1) to (5).

(6) To exit M380 : HOME2 menu, press the F6 (EXIT) button once .

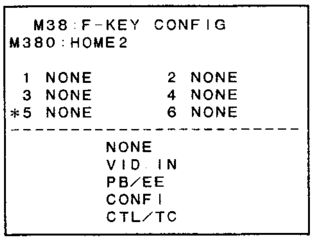
After setting, save the setting by M38F : NV-RAM CONTROL.

Example of display and operation



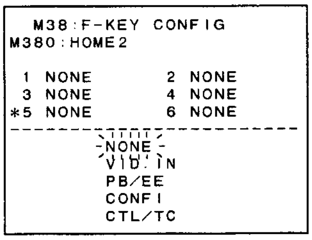
```
 M38:F-KEY CONFIG
M380:HOME2

*1 NONE        2 NONE
 3 NONE        4 NONE
 5 NONE        6 NONE
-----------------------
       NONE
       VID. IN
       PB/EE
       CONF I
       CTL/TC
```

(1) ⇩ MULTI CONTROL



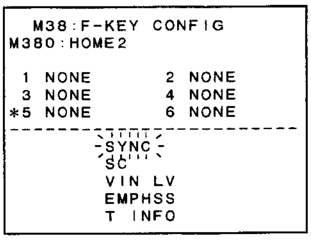
```
 M38:F-KEY CONFIG
M380:HOME2

 1 NONE        2 NONE
 3 NONE        4 NONE
*5 NONE        6 NONE
-----------------------
       NONE
       VID. IN
       PB/EE
       CONF I
       CTL/TC
```

(2) ⇩ F5 (SET)



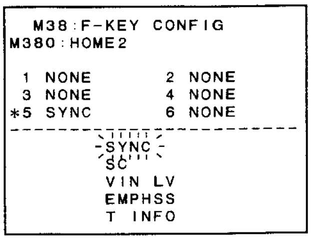
```
 M38:F-KEY CONFIG
M380:HOME2

 1 NONE        2 NONE
 3 NONE        4 NONE
*5 NONE        6 NONE
-----------------------
       NONE
       VID. IN
       PB/EE
       CONF I
       CTL/TC
```

(3) ⇩ MULTI CONTROL



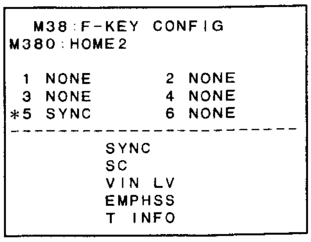
```
 M38:F-KEY CONFIG
M380:HOME2

 1 NONE        2 NONE
 3 NONE        4 NONE
*5 NONE        6 NONE
-----------------------
       SYNC
       SC
       VIN LV
       EMPHSS
       T INFO
```

(4) ⇩ F5 (SET)



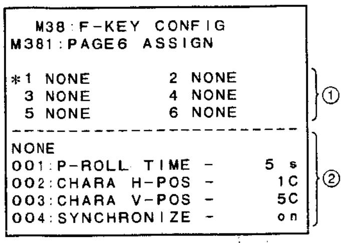
```
 M38:F-KEY CONFIG
M380:HOME2

 1 NONE        2 NONE
 3 NONE        4 NONE
*5 SYNC        6 NONE
-----------------------
       SYNC
       SC
       VIN LV
       EMPHSS
       T INFO
```

(5) ⇩ F6 (EXIT)



```
 M38:F-KEY CONFIG
M380:HOME2

 1 NONE        2 NONE
 3 NONE        4 NONE
*5 SYNC        6 NONE
-----------------------
       SYNC
       SC
       VIN LV
       EMPHSS
       T INFO
```

M381 : PAGE6 ASSIGN



```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

*1 NONE       2 NONE
 3 NONE       4 NONE
 5 NONE       6 NONE
------------------------
NONE
001:P-ROLL TIME -      5 s
002:CHARA H-POS -      1C
003:CHARA V-POS -      5C
004:SYNCHRONIZE -      on
```

This menu is used to assign the desired items of the basic/extended setup menu to F1 through F6 buttons of the PAGE6.

Note

The following setup menu items are cannot be assigned to PAGE6.

Setup menu	Not assignable Item No.
Basic setup menu	003, 017* to 019*, B01 to B20, and H01 to H14
Extended setup menu	603 and 604

* : For only HDW series.

As for the details of the setup menu, refer to the Operation Manual.

Description of superimposed display

① Area 1

The function names that are set to F1 through F6 buttons in setup menu PAGE6 are displayed. When no setup menu is set, NONE is displayed.
(The factory setting is all NONE.)

② Area 2

The setup menu names that can be set to F1 through F6 buttons of the function menu PAGE6 can be displayed in scroll.

To execute the setting

(1) Turn the MULTI CONTROL knob to move the cursor (*) in area 1 to the F button number to be set.
- If the display of area 2 is scrolled, press the F6 (EXIT) button, then turn the MULTI CONTROL knob.

(2) Press the F5 (SET) button once to decide the F button to be set to.
- The name of selected menu item blinks in area 2. When the menu item is not assigned, NONE blinks.

(3) Turn the MULTI CONTROL knob to select (blink) the desired menu item.
- Display of menu items in area 2 scrolls by turning the MULTI CONTROL knob.
- To stop blinking and return to step (1) state, press the F6 (EXIT) button.

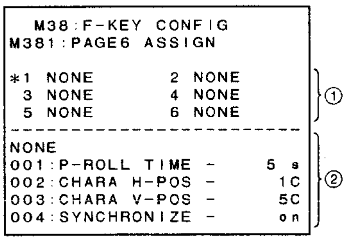
(4) Press the F5 (SET) button once to decide the function to be set.
- The blinking of the menu item in area 2 stops. The number of the menu item selected in area 2 is displayed to the menu item of area 1 (F button to be set).
- When the menu item having the sub menu is selected, the sub menu item is displayed in area 2. Move the cursor (*) to the sub item to be assigned similarly, and press the F5 (SET) button. Then, the selected "Setup menu item No.: # sub item No." is displayed in area 1.
- If you want to change the menu item, turn the MULTI CONTROL knob, and press the F5 (SET) button. The menu item display in area 1 will be changed again.

(5) Press the F6 (EXIT) button once.
- To set a function to other F buttons, repeat steps (1) to (5).

(6) To exit M380 : HOME2 menu, press the F6 (EXIT) button once .

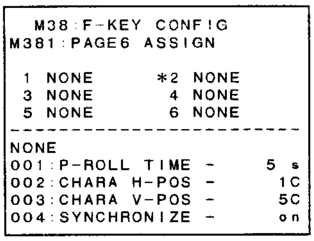
After setting, save the setting by M38F : NV-RAM CONTROL.

Example of display and operation



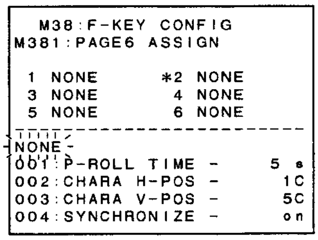
```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

*1 NONE        2 NONE    ⎫
 3 NONE        4 NONE    ⎬①
 5 NONE        6 NONE    ⎭
-------------------------
NONE                     ⎫
001:P-ROLL TIME  -    5 s ⎪
002:CHARA H-POS  -     1C ⎬②
003:CHARA V-POS  -     5C ⎪
004:SYNCHRONIZE  -     on ⎭
```

(1) ⇩ MULTI CONTROL



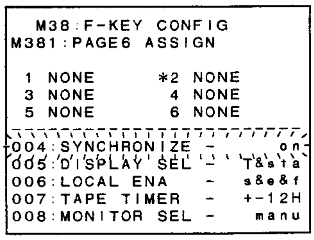
```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

 1 NONE       *2 NONE
 3 NONE        4 NONE
 5 NONE        6 NONE
-------------------------
NONE
001:P-ROLL TIME  -    5 s
002:CHARA H-POS  -     1C
003:CHARA V-POS  -     5C
004:SYNCHRONIZE  -     on
```

(2) ⇩ F5 (SET)



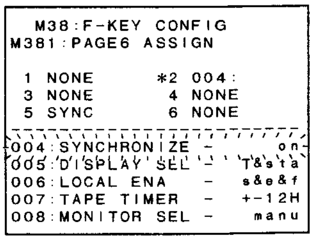
```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

 1 NONE       *2 NONE
 3 NONE        4 NONE
 5 NONE        6 NONE
-------------------------
NONE
001:P-ROLL TIME  -    5 s
002:CHARA H-POS  -     1C
003:CHARA V-POS  -     5C
004:SYNCHRONIZE  -     on
```

(3) ⇩ MULTI CONTROL



```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

 1 NONE       *2 NONE
 3 NONE        4 NONE
 5 NONE        6 NONE
-------------------------
004:SYNCHRONIZE  -     on
005:DISPLAY SEL  -  T&s&ta
006:LOCAL ENA    -   s&e&f
007:TAPE TIMER   -   +-12H
008:MONITOR SEL  -    manu
```

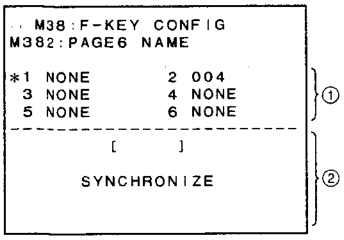
(4) ⇩ F5 (SET)



```
  M38:F-KEY CONFIG
M381:PAGE6 ASSIGN

 1 NONE       *2 004:
 3 NONE        4 NONE
 5 SYNC        6 NONE
-------------------------
004:SYNCHRONIZE  -     on
005:DISPLAY SEL  -  T&s&ta
006:LOCAL ENA    -   s&e&f
007:TAPE TIMER   -   +-12H
008:MONITOR SEL  -    manu
```

(5) ⇩ F6 (EXIT)

M382 : PAGE6 NAME



```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

*1 NONE      2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [      ]

      SYNCHRONIZE
```

This menu is used to set the desired name to the setup menu item assigned to PAGE6.

Description of superimposed display

① Area 1

The function names that are set to F1 through F6 buttons in setup menu item PAGE6 are displayed. When no setup menu item is set, NONE is displayed. (The factory setting is all NONE.)

② Area 2

The function names that can be set to F1 through F6 buttons in setup menu item PAGE6 are displayed in scroll.

To execute the renaming

(1) Turn the MULTI CONTROL knob to move the cursor (*) in area 1 to the F button number to be set.

(2) Press the F5 (SET) button once to decide the F button to be set to.
- The cursor is appeared in area 2. For your reference, the original name of the setup menu is displayed.

(3) Turn the MULTI CONTROL knob while pressing the HOME button to change the character.

(4) To move the cursor, turn the MULTI CONTROL knob.

(5) Repeat the steps (3) and (4) for each character.

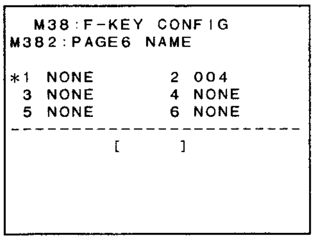
(6) Press the F5 (SET) butten.
- The new name of the F button is displayed in area 1.

(7) Press the F6 (EXIT) button once to decide the name.
- To rename other menu item, repeat steps (1) to (7).

(8) To exit the menu, press the F6 (EXIT) button once.

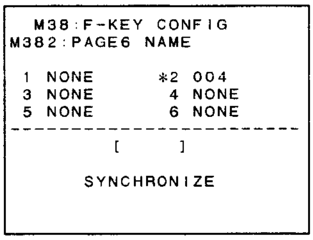
After setting, save the setting by M38F : NV-RAM CONTROL.

Example of display and operation



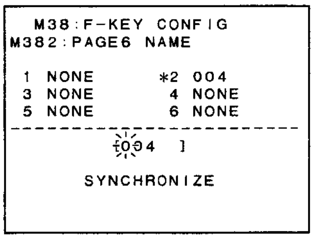
```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

*1 NONE      2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [      ]
```

(1) ⇩ MULTI CONTROL



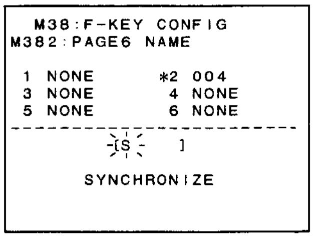
```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

 1 NONE     *2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [      ]

      SYNCHRONIZE
```

(2) ⇩ F5 (SET)



```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

 1 NONE     *2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [004   ]

      SYNCHRONIZE
```

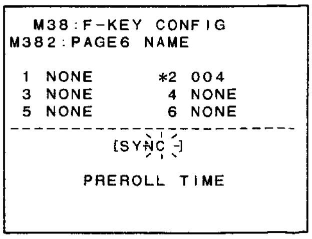
(3) ⇩ HOME + MULTI CONTROL



```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

 1 NONE     *2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [S     ]

      SYNCHRONIZE
```

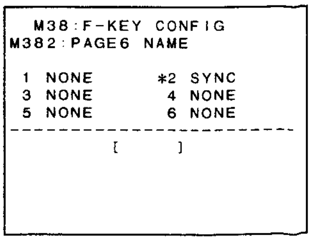
(4) ⇩ MULTI CONTROL

(5) ⇩ repeat steps (3) and (4)



```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

 1 NONE     *2 004
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [SYNC  ]

      PREROLL TIME
```

(6) ⇩ F5 (SET)



```
 M38:F-KEY CONFIG
M382:PAGE6 NAME

 1 NONE     *2 SYNC
 3 NONE      4 NONE
 5 NONE      6 NONE
-------------------------
       [      ]
```

(7) ⇩ F6 (EXIT)

M38F : NV-RAM CONTROL

This menu is used to save the data set in the F-KEY CONFIG mode into the NV-RAM.

Note

When the power is turned off without saving the setting data, the setting data returns to the former saved data.

To execute the menu

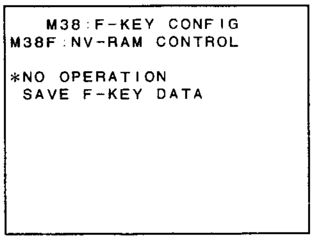
(1) Turn the MULTI CONTROL knob to set the * mark to "SAVE F-KEY DATA" on the superimposed display or to display "SAVE F-KEY DATA" on the menu display area.

(2) Press F5 (SET) button once.
  - On pressing it, the data transmission is initiated.
  - A message "Saving..." will be displayed on the superimposed display.

(3) Check that the data transmission is completed.
  - On completing the data transmission, "Save Complete" will be displayed on the superimposed display and "SaveCmp" will be displayed on the menu display area.
  - If the saving is not performed properly due to some abnormality, "Save Failure" is displayed on the superimposed display and "SaveFail" is displayed on the menu display area.

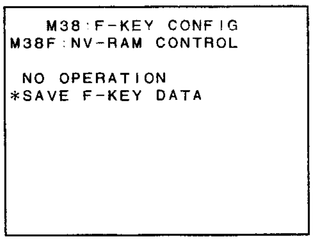
(4) To exit the menu, press F6 (EXIT) button once.

Example of display and operation



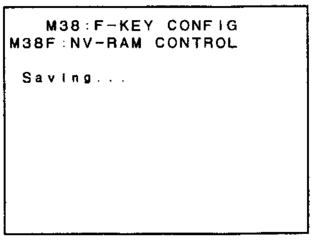
```
   M38:F-KEY CONFIG
M38F:NV-RAM CONTROL

*NO OPERATION
 SAVE F-KEY DATA
```

(1) ⇩ MULTI CONTROL



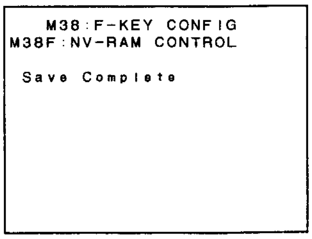
```
   M38:F-KEY CONFIG
M38F:NV-RAM CONTROL

 NO OPERATION
*SAVE F-KEY DATA
```

(2) ⇩ F5 (SET)



```
   M38:F-KEY CONFIG
M38F:NV-RAM CONTROL

 Saving...
```

⇩



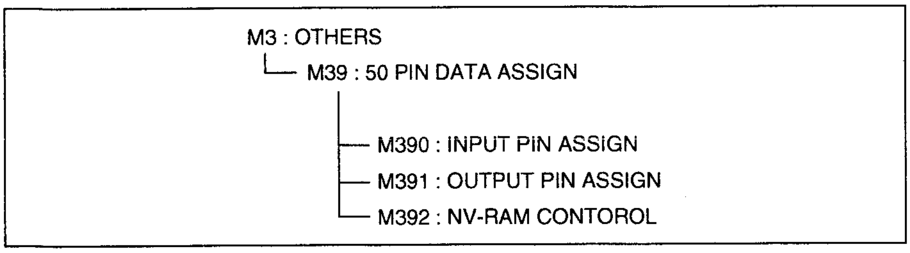
```
   M38:F-KEY CONFIG
M38F:NV-RAM CONTROL

 Save Complete
```

(3) ⇩ Check

(4) ⇩ F6 (EXIT)

3-5-8. 50PIN DATA ASSIGN Mode (M39)

The M39 : 50PIN DATA ASSIGN mode changes the pin setup data of 50-pin parallel remote which are settable. Also it displays the logic level of the input pin.



Menu Tree of 50PIN DATA ASSIGN Mode

CAUTION

Do not change the setting data carelessly. This may cause a trouble. For the actual setting, refer to the optional parallel remote (50-pin) connector interface manual.
If you have changed the setting data carelessly, execute ALL DATA PREVIOUS in M392 : NV-RAM CONTROL menu or turn off the power of this unit without selecting M392 : NV-RAM CONTROL. Never execute SAVE ALL DATA.

M390 : INPUT PIN ASSIGN

This menu changes the input pin setup data. Also it displays the logic level of the input pin.

Description of display

The pin numbers are displayed at the column of "No.". Also the right at the pin number displays the logic level state (H; high, L; low).

To change the setup data

(1) Turn the MULTI CONTROL knob to set the * mark to the left side of the data to be changed.

(2) Turn the MULTI CONTROL knob while pressing the HOME button to change the data.

↻ : Data value increase
↺ : Data value decrease

Note

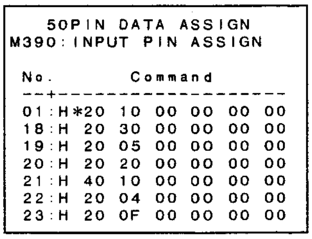
At the highest byte, the data change only area of which from 00 to 73.

(3) Repeat steps (1) and (2) for any other data.

(4) To exit the menu, press the F6 (EXIT) button once.

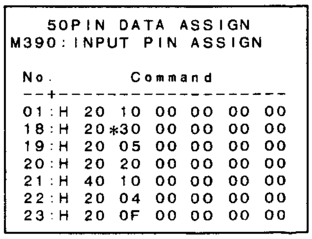
(5) To save the setup data into the NV-RAM, execute the SAVE ALL DATA in M392 : NV-RAM CONTROL menu.

Example of display and operation



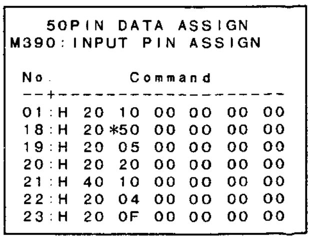
```
   50PIN DATA ASSIGN
M390: INPUT PIN ASSIGN

 No.       Command
 --+-----------------
 01:H*20 10 00 00 00 00
 18:H 20 30 00 00 00 00
 19:H 20 05 00 00 00 00
 20:H 20 20 00 00 00 00
 21:H 40 10 00 00 00 00
 22:H 20 04 00 00 00 00
 23:H 20 0F 00 00 00 00
```

(1) ⇩ MULTI CONTROL



```
   50PIN DATA ASSIGN
M390: INPUT PIN ASSIGN

 No.       Command
 --+-----------------
 01:H 20 10 00 00 00 00
 18:H 20*30 00 00 00 00
 19:H 20 05 00 00 00 00
 20:H 20 20 00 00 00 00
 21:H 40 10 00 00 00 00
 22:H 20 04 00 00 00 00
 23:H 20 0F 00 00 00 00
```

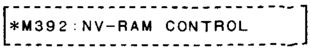
(2) ⇩ HOME + MULTI CONTROL



```
   50PIN DATA ASSIGN
M390: INPUT PIN ASSIGN

 No.       Command
 --+-----------------
 01:H 20 10 00 00 00 00
 18:H 20*50 00 00 00 00
 19:H 20 05 00 00 00 00
 20:H 20 20 00 00 00 00
 21:H 40 10 00 00 00 00
 22:H 20 04 00 00 00 00
 23:H 20 0F 00 00 00 00
```

(4) ⇩ F6 (EXIT)

(5) Data saving



```
*M392: NV-RAM CONTROL
```

M391 : OUTPUT PIN ASSIGN

This menu changes the output pin setup data. Also it displays the logic level of the output pin.

Description of display

The pin numbers are displayed at the column of "No.". Also the right at the pin number displays the logic level state (H;high, L;low).

To change the setup data

(1) Turn the MULTI CONTROL knob to set the * mark to the left side of the data to be changed.

(2) Turn the MULTI CONTROL knob while pressing the HOME button to change the data.

↻ : Data value increase

↺ : Data value decrease

Note

At the highest byte, the data change only area of which from 00 to 0D.

(3) Repeat steps (1) and (2) for any other data.

(4) To exit the menu, press the F6 (EXIT) button once.

(5) To save the setup data in the NV-RAM, execute the SAVE ALL DATA in M392 : NV-RAM CONTROL menu.

Example of display and operation

```
   50PIN DATA ASSIGN
M391:OUTPUT PIN ASSIGN

 No.       Command
 --+------------------
 10:H*02 02 72 20 00 00
 11:H 02 02 72 10 00 00
 12:H 01 02 00 20 00 00
 13:H 02 02 2B 08 00 00
 26:H 02 02 72 08 00 00
 27:H 02 02 04 10 00 00
 28:H 02 02 01 10 00 00
```

(1) ⇩ MULTI CONTROL

```
   50PIN DATA ASSIGN
M391:OUTPUT PIN ASSIGN

 No.       Command
 --+------------------
 10:H 02 02 72 20 00 00
 11:H 02*02 72 10 00 00
 12:H 01 02 00 20 00 00
 13:H 02 02 2B 08 00 00
 26:H 02 02 72 08 00 00
 27:H 02 02 04 10 00 00
 28:H 02 02 01 10 00 00
```

(2) ⇩ HOME + MULTI CONTROL

```
   50PIN DATA ASSIGN
M391:OUTPUT PIN ASSIGN

 No.       Command
 --+------------------
 10:H 02 02 72 20 00 00
 11:H 02*01 72 10 00 00
 12:H 01 02 00 20 00 00
 13:H 02 02 2B 08 00 00
 26:H 02 02 72 08 00 00
 27:H 02 02 04 10 00 00
 28:H 02 02 01 10 00 00
```

(4) ⇩ F6 (EXIT)

(5) Data saving

```
*M392:NV-RAM CONTROL
```

M392 : NV-RAM CONTROL

This menu is used to save the input/output data set in the M39 : 50 PIN DATA ASSIGN mode into the NV-RAM.

The current setup data can return to the former saved data before the change when executing ALL DATA PREVIOUS without saving the setup data into the NV-RAM.

Note

When the power is turned off without saving the changed data, the setup data returns to the former saved data.

To execute the menu

(1) Turn the MULTI CONTROL knob to set the * mark on the superimposed display as described below.

To save the setup data after changing :

⇨ "SAVE ALL DATA"

To return the setup data before changing :

⇨ "ALL DATA PREVIOUS"

To return the setup data to factory setting, and save the data:

⇨ "RESET ALL DATA"

(2) Press the F5 (SET) button.

- On pressing it, the data transmission is initiated.
- A message "Saving ..." or "Loading ..." will be displayed.

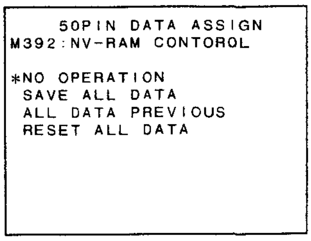
(3) Check that the data transmission is completed.

- On completing the data transmission :

  A message "Save Complete." or "Load Complete" will be displayed.

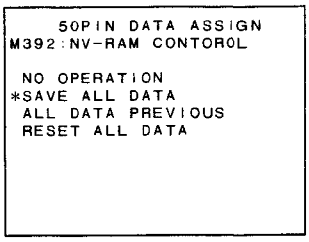
(4) To exit the menu, press the F6 (EXIT) button once.

Example of display and operation



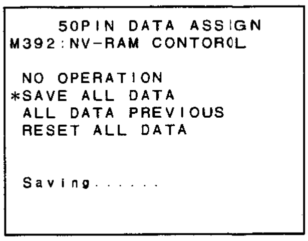
```
     50PIN DATA ASSIGN
M392:NV-RAM CONTOROL

*NO OPERATION
 SAVE ALL DATA
 ALL DATA PREVIOUS
 RESET ALL DATA
```

(1) ⇩ MULTI CONTROL (○)



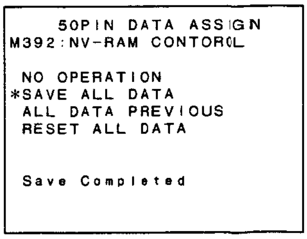
```
     50PIN DATA ASSIGN
M392:NV-RAM CONTOROL

 NO OPERATION
*SAVE ALL DATA
 ALL DATA PREVIOUS
 RESET ALL DATA
```

(2) ⇩ F5 (SET)



```
     50PIN DATA ASSIGN
M392:NV-RAM CONTOROL

 NO OPERATION
*SAVE ALL DATA
 ALL DATA PREVIOUS
 RESET ALL DATA

 Saving......
```

⇩



```
     50PIN DATA ASSIGN
M392:NV-RAM CONTOROL

 NO OPERATION
*SAVE ALL DATA
 ALL DATA PREVIOUS
 RESET ALL DATA

 Save Completed
```

(3) ⇩ Check

(4) ⇩ F6 (EXIT)

3-5-9. OUTPUT PHASE SELECT Mode (M3A)

This mode is used for setting the output signal phase of HD SDI video and SD video (D1SDI/Y-R, B/Composite) output signals.

Note

For the setting of audio and time code output phase, refer to the "Setup Menu 338 : OUTPUT Audio/TC Phase" of the operation manual.

Description of superimposed display

M3A0 : HD PHASE SEL (HDW series only)

This menu is used for setting the HD SDI video output phase.
The HD SDI output signal phase can be selected whether the signal is output by the 0H (same phase) or output by −90H (HD) Advance to the REF signal. This setting is possible when the external down-converter is used or when the system for HD is used in −90H advance system.

0H:	Outputs the signal by the same phase to REF signal. (factory setting)
−90H:	Outputs the signal by −90H (HD) phase to REF signal.

M3A1 : SD PHASE SEL

This menu is used for setting the SD video output phase.
The SD video (D1SDI/Y-R, B/Composite) output signal phase can be selected whether the signal is output by the 0H (same phase) or output by −2H (SD) Advance to the REF signal. This setting is possible when the D1/D2 conversion is performed externally.

0H:	Outputs the signal by the same phase to REF signal. (factory setting)
−2H:	Outputs the signal by −2H (SD) phase to REF signal.

M3A2 : SD UPCONV SEL (HDW series only)
HD PHASE SEL (DVW/MSW series with BKMW-104)

This menu is used for setting the SD video output phase during the SD tape playing back.
The SD video (D1SDI/Y-R, B/Composite) output signal phase can be selected whether the signal is output by the 0H (same phase) or output by one Frame delay to the REF signal. This setting is possible to make the output signal into the same phase between the up-converted HD SDI output and SD system video output signals. This setting is possible when the external up-converter is used, or when the HD output and SD output are used in the operation with the same phase.

noml/+1F*:	The output of the SD video (D1SDI/Y-R, B/Composite) is output with the same phase to the REF signal. The output of the HDSDI video signal is output with one frame delay. (factory setting)
HD/0F*:	The outputs of the SD video (D1SDI/Y-R, B/Composite) and HD SDI video are output with the same phase to the REF signal.

*: When the HD upconverter BKMW-104 is installed into DVW/MSW series, this character is displayed.

Setting of output phase

(1) Turn the MULTI CONTROL knob to align the * mark with the desired item.
(2) Turn the MULTI CONTROL knob while pressing the HOME button to select the output phase.
(3) Press the F5 (SET) button.
(4) Turn off the power of the VTR once, and turn ON again.

Example of display and operation

```
SETUP MAINTENANCE MODE
M3A:OUTPUT PHASE SELECT

*M3A0:HD PHASE SEL:    0H
 M3A1:SD PHASE SEL:    0H
 M3A2:SD UPCNV SEL:  noml
```

(1) ⇩ MULTI CONTROL

```
SETUP MAINTENANCE MODE
M3A:OUTPUT PHASE SELECT

 M3A0:HD PHASE SEL:    0H
*M3A1:SD PHASE SEL:   -2H
 M3A2:SD UPCNV SEL:  noml

Push SET button
```

(2) ⇩ HOME + MULTI CONTROL
(3) ⇩ F5 (SET)

```
SETUP MAINTENANCE MODE
M3A:OUTPUT PHASE SELECT

 M3A0:HD PHASE SEL:    0H
*M3A1:SD PHASE SEL:   -2H
 M3A2:SD UPCNV SEL:  noml

Save Complete
   Turn the power off!
```

(4) ⇩ Power OFF → ON

3-5-10. VANC RX PARAMETER Mode (M3B)

This mode is used for setting the RX parameter of HD SDI V-ANC data.
When the V-ANC data set here is received, it can be recorded on the tape and played back.

Note

This mode corresponds to one packet (Example of display and operation ①) or three packets (Example of display and operation ②) in accordance to the version of the machine.

Description of superimposed display

LINE1 (LN1)

This menu is used to set the line number (odd field) on the HD SDI with which the V-ANC to receive is inserted.
Effective line range is 9 to 20 lines.

LINE2 (LN2)

This menu is used to set the line number (even field) on the HD SDI with which the V-ANC to receive is inserted.
Effective line range is 572 to 583 lines.

DID

This menu is used to set the DID of the V-ANC to receive.

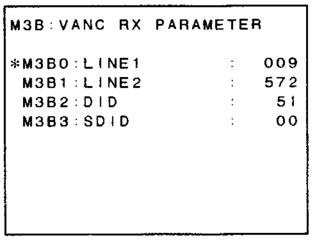
SDID

This menu is used to set the SDID of the V-ANC to receive.

To set the menu

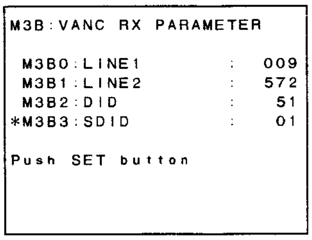
(1) Turn the MULTI CONTROL knob to align the * mark with the desired item.
(2) Turn the MULTI CONTROL knob while pressing the HOME button to change the setting contents.
Push the MULTI CONTROL knob, and the PUSH lamp will light to set the upper digit of DID and SDID.
(3) Press the F5 (SET) button.
(4) Turn off the power of the VTR once, and turn ON again.

Example of display and operation ①



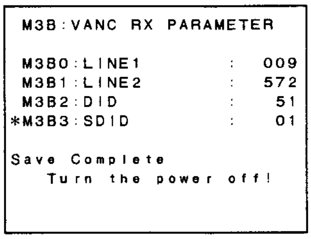
```
M3B:VANC RX PARAMETER

*M3B0:LINE1     :  009
 M3B1:LINE2     :  572
 M3B2:DID       :   51
 M3B3:SDID      :   00
```

(1) ⇩ MULTI CONTROL



```
M3B:VANC RX PARAMETER

 M3B0:LINE1     :  009
 M3B1:LINE2     :  572
 M3B2:DID       :   51
*M3B3:SDID      :   01

Push SET button
```

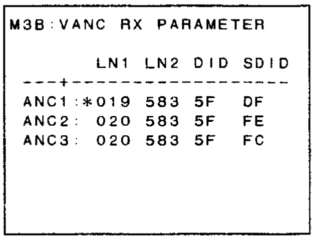
(2) ⇩ HOME + MULTI CONTROL
(3) ⇩ F5 (SET)



```
M3B:VANC RX PARAMETER

 M3B0:LINE1     :  009
 M3B1:LINE2     :  572
 M3B2:DID       :   51
*M3B3:SDID      :   01

Save Complete
   Turn the power off!
```

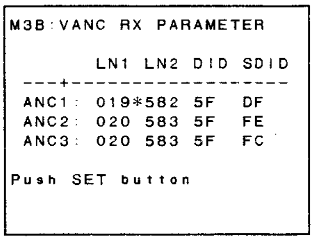
(4) ⇩ Power OFF → ON

Example of display and operation ②



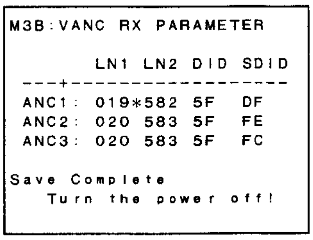
```
M3B:VANC RX PARAMETER

        LN1  LN2  DID  SDID
---+-------------------
ANC1 :*019  583  5F   DF
ANC2:  020  583  5F   FE
ANC3:  020  583  5F   FC
```

(1) ⇩ MULTI CONTROL



```
M3B:VANC RX PARAMETER

        LN1  LN2  DID  SDID
---+-------------------
ANC1:  019*582  5F   DF
ANC2:  020  583  5F   FE
ANC3:  020  583  5F   FC

Push SET button
```

(2) ⇩ HOME + MULTI CONTROL
(3) ⇩ F5 (SET)

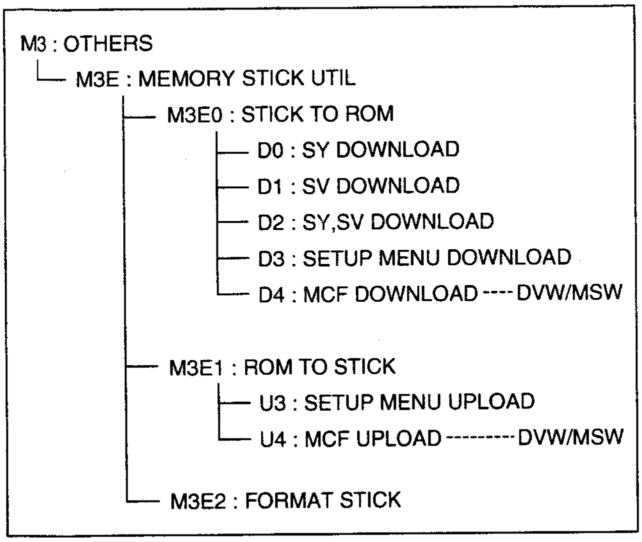


```
M3B:VANC RX PARAMETER

        LN1  LN2  DID  SDID
---+-------------------
ANC1:  019*582  5F   DF
ANC2:  020  583  5F   FE
ANC3:  020  583  5F   FC

Save Complete
   Turn the power off!
```

(4) ⇩ Power OFF → ON

3-5-11. MEMORY STICK UTIL Mode (M3E)

M3E : MEMORY STICK UTIL is used to downloading or uploading the software/data by using the Memory Stick. Refer to Section 1-27 as to the usable Memory Stick.


M3 : OTHERS
M3E : MEMORY STICK UTIL
M3E0 : STICK TO ROM
D0 : SY DOWNLOAD
D1 : SV DOWNLOAD
D2 : SY,SV DOWNLOAD
D3 : SETUP MENU DOWNLOAD
D4 : MCF DOWNLOAD ---- DVW/MSW
M3E1 : ROM TO STICK
U3 : SETUP MENU UPLOAD
U4 : MCF UPLOAD --------- DVW/MSW
M3E2 : FORMAT STICK

Menu Tree of MEMORY STICK UTIL Mode

Note

D4 : MCF DOWNLOAD and U4 : MCF UPLOAD are not available for HDW series.

M3E0 : STICK TO ROM

This mode is used to download the data/software saved in a Memory Stick to this unit.

CAUTION

The software must be written on the Memory Stick to perform downloading the software (D0 to D2). Consult Sony sales office to write the software.

D0 : SY DOWNLOAD

This menu is used to download the software for system control.

D1 : SV DOWNLOAD

This menu is used to download the software for servo control.

D2 : SY, SV DOWNLOAD

This menu is used to download the software for system control and servo control together.

D3 : SETUP MENU DOWNLOAD

This menu is used to download the setting data of setup menu.

D4 : MCF DOWNLOAD (for DVW/MSW series)

This menu is used to download the following data at a time.

- Setting data of the setup menu
- Data recorded on "SETUP BANK4" (Refer to Section 3-6-3.)
- Customized data of the setup menu (Refer to Section 1-28.)

Note

The SY software version used during downloading the MCF data with MCF DOWNLOAD must be the same as that used during upload by using "U4 : MCF UPLOAD" in the "M3E1 : ROM TO STICK" or "M3F1 : ROM TO CARD" menu.
If the versions used during upload and download do not match, a message "Ver.(SY) do not match!", "PUSH EXIT BUTTON" is displayed, disabling download of the MCF data.

To execute downloading

(1) Open the lower control panel.

(2) Prepare a Memory Stick on which software/data to be downloaded has been written. Insert the Memory Stick into the Memory Stick slot of the switch panel

(3) Initiate the maintenance mode and select the D0, D1 or D2 menu.

(4) Turn the MULTI CONTROL knob to set the * mark to the software/data to be downloaded on the superimposed display.

(5) Press the F5 (SET) button once.

- On pressing it, the Memory Stick ID and the software/data are checked.
  When any abnormality does not found, the software name, and its version or data name will be displayed. And also, message "EXECUTE-OFF" will be displayed.
  If some abnormality is found, an error message below is displayed.

Error message

- NOT MS-DOS FORMAT STICK! SET THE CORRECT STICK:
  The Memory Stick does not formatted for MS-DOS.
  ⇨ Use a Memory Stick formatted for MS-DOS.
- FILE NOT FOUND. SET THE CORRECT STICK:
  A correct file does not found in the Memory Stick.
  ⇨ Write a correct software/data to the Memory Stick.
- NO MEMORY STICK!:
  A Memory Stick is not properly inserted.
  ⇨ Insert the Memory Stick deep into the slot.

(6) When downloading software, check the displayed software version.

- The number displayed on the ROM column is the software version of this unit.
  The number displayed on the STICK column is the software version written on the Memory Stick.
  When the version on the STICK column is lower than that on the ROM column, it is unnecessary to download the software. Press the F6 (EXIT) button to exit the menu.
- When two or more software versions are written on the Memory Stick, select the version to be downloaded.
  With the * mark positioned to the left of the desired version, turn the MULTI CONTROL knob while pressing the HOME button.

When executing download, proceed to step (7) and later.

Downloading

Note

Strictly observe the followings during downloading.

- Do not turn off the power.
- Do not insert nor remove the Memory Stick.
- Do not insert any cassette tape.

Otherwise the software of the ROM side of this unit will damage, disabling proper downloading.

(7) Turn the MULTI CONTROL knob to set the * mark to "EXECUTE-OFF!".

(8) Turn the MULTI CONTROL knob clockwise to change the display to "EXECUTE-ON!".
- When the display is changed to "EXECUTE-ON!", "PUSH SET BUTTON TO EXECUTE" is displayed.
- When turning the MULTI CONTROL knob counterclockwise, the display returns to "EXECUTE-OFF".

(9) Press the F5 (SET) button once to execute download.
- During download, "Downloading..." is displayed.

(10)Check that downloading is completed.
- On completing download correctly, "Download Complete" is displayed. And also, when completing software download, "Turn the power off!" is displayed.
  If the download is not correctly completed due to some abnormality, "Load Failure! Turn the power off!" is displayed. In this case, turn the power off at first, then find a cause.

(11)Exit the maintenance mode.

Check after software downloading

The check procedure after software downloading (D0 to D2) is described below.

(12)Turn the power off.

(13)Turn the power on.
- The initialize time will be longer than ordinary.

Note

Software is saved in the flash ROM in this unit. When turning the power on, the software version in the EEP-ROM in the MPU is compared with that in the flash ROM. If the version is different each other, the software in the flash ROM is uploaded to the EEP-ROM in the MPU. After that, this unit is again initialized by the uploaded software.

(14)Activate the maintenance mode.

(15)Select M30 : ROM VERSION.

(16)Check that the software version is that of the downloaded software.

Example of display and operation

EX. D2 : SY, SV DOWNLOAD

```
M3E0:STICK TO ROM
     DOWNLOAD MENU

*D0:SY DOWNLOAD
 D1:SV DOWNLOAD
 D2:SY. SV DOWNLOAD
```

(4) ⇩ MULTI CONTROL

```
M3E0:STICK TO ROM
     DOWNLOAD MENU

 D0:SY DOWNLOAD
 D1:SV DOWNLOAD
*D2:SY. SV DOWNLOAD
```

(5) ⇩ F5 (SET)

```
M3E0:STICK TO ROM
D2:SY. SV DOWNLOAD

         STICK -> ROM
*SY   V1.10     V1.00
 SV   V1.10     V1.00

     EXECUTE - OFF
```

(6) ⇩ Check

(7) ⇩ MULTI CONTROL

```
M3E0:STICK TO ROM
D2:SY. SV DOWNLOAD

         STICK -> ROM
 SY   V1.10     V1.00
 SV   V1.10     V1.00

    *EXECUTE - OFF
```

(8) ⇩ HOME + MULTI CONTROL (↻)

```
M3E0:STICK TO ROM
D2:SY. SV DOWNLOAD

         STICK -> ROM
 SY   V1.10     V1.00
 SV   V1.10     V1.00

    *EXECUTE - ON

PUSH SET BUTTON
              TO EXECUTE
```

(9) ⇩ F5 (SET)

```
M3E0:STICK TO ROM
D2:SY. SV DOWNLOAD

         STICK -> ROM
 SY   V1.10     V1.00
 SV   V1.10     V1.00

    *EXECUTE - OFF

Downloading...
```

⇩

```
M3E0:STICK TO ROM
D2:SY. SV DOWNLOAD

         STICK -> ROM
 SY   V1.10     V1.00
 SV   V1.10     V1.00

    *EXECUTE - OFF

Download Complete
  Turn the power off!
```

(10) ⇩ Check

M3E1 : ROM TO STICK

This sub mode is used to upload the setup menu data saved in this unit to the Memory Stick.

U3 : SETUP MENU UPLOAD

This menu is used to upload the setting data of setup menu.

U4 : MCF UPLOAD (for DVW/MSW series)

This menu is used to upload the following data at a time.

- Setting data of the setup menu
- Data recorded on “SETUP BANK4” (Refer to Section 3-6-3.)
- Customized data of the setup menu (Refer to Section 1-28.)

To execute uploading

(1) Open the lower control panel.

(2) Insert the Memory Stick with available space into the Memory Stick slot of the switch panel.

(3) Initiate the maintenance mode and select this sub mode.
The sub mode screen is displayed. The following massages may be displayed according to the Memory Stick inserted.

- NOT MS-DOS FORMAT STICK! SET THE CORRECT STICK:
  The inserted Memory Stick is not formatted for MS-DOS.
  ⇨ Format the Memory Stick using this sub mode.
- NO MEMORY STICK!:
  A Memory Stick is not properly inserted.
  ⇨ Insert the Memory Stick deep into the slot.

(4) Turn the MULTI CONTROL knob clockwise while pressing the HOME button to change the message from “EXECUTE-OFF” to “EXECUTE-ON!”.

- On changing the massage to “EXECUTE-ON!”, “PUSH SET BUTTON TO EXECUTE” will be displayed.
- Turning the MULTI CONTROL knob counterclockwise returns the message to “EXECUTE-OFF!”

(5) Press the F5 (SET) button once to execute uploading.

- During uploading, “Up Loading...” is displayed.

(6) Check that uploading is completed.

- When uploading is completed normally, the message “Up Load Complete” is displayed.

(7) Exit the maintenance mode.

Example of display and operation

```
M3E1:ROM TO STICK
 U3:SETUP MENU UPLOAD

    STICK <- VTR

  File:

    MSWNR001.SUP

   *EXECUTE - OFF
```

(4) ⇩ HOME + MULTI CONTROL (↻)

```
M3E1:ROM TO STICK
 U3:SETUP MENU UPLOAD

    STICK <- VTR

  File:

    MSWNR001.SUP

   *EXECUTE - ON
 PUSH SET BUTTON
            TO EXECUTE
```

(5) ⇩ F5 (SET)

```
M3E1:ROM TO STICK
 U3:SETUP MENU UPLOAD

    STICK <- VTR

  File:

    MSWNR001.SUP

   *EXECUTE - OFF
 Up Loading...
```

(6) ⇩

```
M3E1:ROM TO STICK
 U3:SETUP MENU UPLOAD

    STICK <- VTR

  File:

    MSWNR001.SUP
   *
    EXECUTE - OFF
 Up Load Complete.
```

M3E2 : FORMAT STICK

This mode is used to format the Memory Stick in MS-DOS.
In case below, format the Memory Stick using this mode.

- When a new Memory Stick is used in this unit
- When an error occurred during executing M3E0: STICK TO ROM

CAUTION

On executing M3E2: FORMAT STICK, whole data in the Memory Stick is erased.

To execute formatting

(1) Open the lower control panel.

(2) Insert the Memory Stick into the Memory Stick slot of the switch panel

(3) Initiate the maintenance mode and select the M3E2: FORMAT STICK.
The M3E2 screen is displayed. The following massages may be displayed according to the Memory Stick inserted.
  - NO MEMORY STICK!:
    A Memory Stick is not properly inserted.
    ⇨ Insert the Memory Stick deep into the slot.
  - NOT MS-DOSFORMAT STICK! SET THE CORRECT STICK:
    The stick does not formatted for MS-DOS.
    ⇨ Format the Memory Stick using this menu.

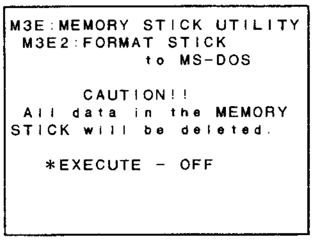
(4) Turn the MULTI CONTROL knob clockwise while pressing the HOME button to change the message from “EXECUTE-OFF” to “EXECUTE-ON”.
  - On changing the massage to “EXECUTE-ON!”, “PUSH SET BUTTON TO EXECUTE” will be displayed.
  - Turning the MULTI CONTROL knob counterclockwise returns the message to “EXECUTE-OFF!”

(5) Press the F5 (SET) button once to execute formatting.
  - During formatting, “Formatting (MS-DOS)...”is displayed.

(6) Check that formatting is completed.
  - When formatting is completed normally, the message “Format Complete” is displayed.
  - If formatting is not completed normally due to some abnormality, “Format Failure! Turn the power off!” is displayed. In this case, turn the power off at first, then find a cause.

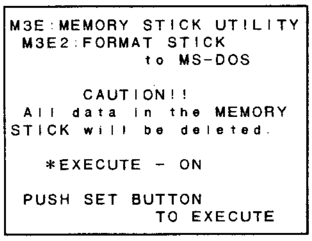
(7) Terminate the maintenance mode.

Example of display and operation



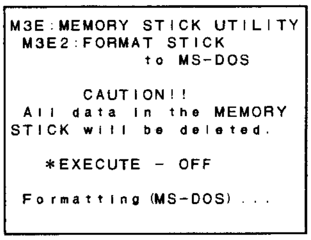
```
M3E:MEMORY STICK UTILITY
 M3E2:FORMAT STICK
             to MS-DOS

        CAUTION!!
 All data in the MEMORY
STICK will be deleted.

   *EXECUTE - OFF
```

(4) ⇩ HOME + MULTI CONTROL (↻)



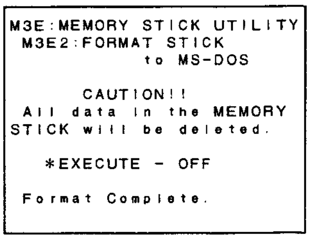
```
M3E:MEMORY STICK UTILITY
 M3E2:FORMAT STICK
             to MS-DOS

        CAUTION!!
 All data in the MEMORY
STICK will be deleted.

   *EXECUTE - ON

 PUSH SET BUTTON
              TO EXECUTE
```

(5) ⇩ F5 (SET)



```
M3E:MEMORY STICK UTILITY
 M3E2:FORMAT STICK
             to MS-DOS

        CAUTION!!
 All data in the MEMORY
STICK will be deleted.

   *EXECUTE - OFF

 Formatting (MS-DOS)...
```

(6) ⇩



```
M3E:MEMORY STICK UTILITY
 M3E2:FORMAT STICK
             to MS-DOS

        CAUTION!!
 All data in the MEMORY
STICK will be deleted.

   *EXECUTE - OFF

 Format Complete.
```

3-5-12. MEMORY CARD UTILITY Mode (M3F)

Notes

- This menu is not displayed for HDW-D2000/S2000/S2000P, DVW series, and MSW-2000/M2000E/M2000EP/M2100E/M2100EP.
- To operate this mode, insert a memory card in the unit first.
  The mode (M3F) is displayed when the memory card is inserted in the unit.

M3F : MEMORY CARD UTILITY is used to downloading or uploading the software/data by using the memory card.
Refer to Section 1-27 as to the usable memory card.

```
M3 : OTHERS
 └─ M3F : MEMORY CARD UTILITY
         ├─ M3F0 : CARD TO ROM
         │        ├─ D0 : SY DOWNLOAD
         │        ├─ D1 : SV DOWNLOAD
         │        ├─ D2 : SY,SV DOWNLOAD
         │        ├─ D3 : SETUP MENU DOWNLOAD
         │        └─ D4 : MCF DOWNLOAD----DVW/MSW
         │
         ├─ M3F1 : ROM TO CARD
         │        ├─ U3 : SETUP MENU UPLOAD
         │        └─ U4 : MCF UPLOAD---------DVW/MSW
         │
         └─ M3F2 : FORMAT CARD
```

Menu Tree of MEMORY CARD UTILITY Mode

The operation of this mode is the same as M3E : MEMORY STICK UTIL. Refer to Section 3-5-11.

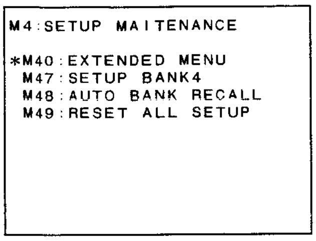
Error message

- INVALID PC CARD! SET THE CORRECT CARD:
  The card does not identified as a memory card. It may be a PC card or a non approved card, such as too small capacity (Ex. 1 MB).
  ⇨ Use a usable memory card.
- NOT MS-DOS FORMAT CARD! SET THE CORRECT CARD:
  The card does not formatted for MS-DOS.
  ⇨ Use a memory card formatted for MS-DOS.
- FILE NOT FOUND. SET THE CORRECT CARD:
  A correct file does not found in the memory card.
  ⇨ Write a correct software/data to the memory card.
- NO MEMORY CARD!:
  A memory card is not properly inserted.
  ⇨ Insert the memory card deep into the slot.

3-6. SETUP MAINTENANCE Mode (M4)

3-6-1. Outline

This mode is used for the setup menu.



```
M4:SETUP MAITENANCE

*M40:EXTENDED MENU
 M47:SETUP BANK4
 M48:AUTO BANK RECALL
 M49:RESET ALL SETUP
```

Note

To select M49 : RESET ALL SETUP, turn the MULTI CONTROL knob while pressing the HOME button.

3-6-2. EXTENDED MENU Display Selection Menu (M40)

It is selected by switching DIP switch S1502 Bit 1 on the SS-89 board whether the extended menus of the setup menu are displayed or not.
However, only when this switch is OFF, the extended menus are enabled to display by this menu.

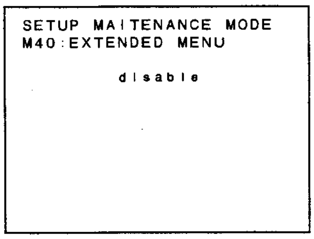
Notes

- The factory setting of the DIP switch S1502 Bit-1 is set to OFF for the MSW series, and set to ON for HDW series.
- When the setting of S1502 Bit-1 is ON, the extended menus are enabled to display regardless of the setting in this menu.

To execute

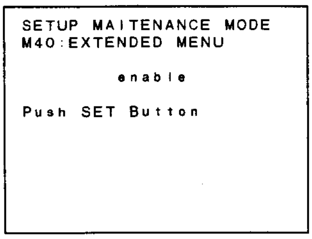
(1) Turn the MULTI CONTROL knob while pressing the HOME button to display the desired setting.
disable : Not display the extended menu
enable : Display the extended menu
(2) Press the F5 (SET) button once to save the setting.

Example of display and operation



```
SETUP MAITENANCE MODE
M40:EXTENDED MENU

        disable
```

(1) ⇩ HOME + MULTI CONTROL



```
SETUP MAITENANCE MODE
M40:EXTENDED MENU

        enable

Push SET Button
```

(2) ⇩ F5 (SET)

3-6-3. SETUP BANK4 Setting Menu (M47)

This menu is used to memorize the setup menu into BANK4.

To execute

(1) Turn the MULTI CONTROL knob to align the * mark with the desired item.

NO OPERATION: Setting is not performed.
SAVE CURRENT TO BANK4: Memorize the current menu into BANK4.
SAVE BANK1 TO BANK4: Memorize the BANK1 into BANK4.
SAVE BANK2 TO BANK4: Memorize the BANK2 into BANK4.
SAVE BANK3 TO BANK4: Memorize the BANK3 into BANK4.
RESET BANK4: Memorize the default settings into BANK4.

(2) Press the F5 (SET) button to memorize the setting.

Example of display and operation

```
SETUP MAINTENANCE MODE
M47:SETUP BANK4

*NO OPERATION
 SAVE CURRENT TO BANK4
 SAVE BANK1   TO BANK4
 SAVE BANK2   TO BANK4
 SAVE BANK3   TO BANK4
 RESET BANK4
```

(1) ⇩ MULTI CONTROL
(2) ⇩ [F5] (SET)

3-6-4. AUTO BANK RECALL Setting Menu (M48)

This menu is used to set the automatical SETUP BANK RECALL when the power is turned on.

To execute

(1) Turn the MULTI CONTROL knob while pressing the HOME button to display the desired BANK.

off : No BANK RECALL is not performed when the power is turned on.
from BANK 1 : Recalls the BANK1 when the power is turned on.
from BANK 2 : Recalls the BANK2 when the power is turned on.
from BANK 3 : Recalls the BANK3 when the power is turned on.
from BANK 4 : Recalls the BANK4 when the power is turned on.

(2) Press the F5 (SET) button to save the setting.

Example of display and operation

```
SETUP MAINTENANCE MODE
M48:AUTO BANK RECALL

          *OFF
```

(1) ⇩ [HOME] + MULTI CONTROL

```
SETUP MAINTENANCE MODE
M48:AUTO BANK RECALL

          *from BANK1

Push SET Button

------ Caution ------
On this setting,
Recall setup menu from
user bank automaticaly
when turn on the VTR.
```

(2) ⇩ [F5] (SET)

3-6-5. RESET ALL SETUP Executing Menu (M49)

Reset the following settings to the factory setting at once.

- All "current" and "bank" in the setup menu
  For 525 mode : current, bank1, bank2, bank3, bank4
  For 625 mode : current, bank1, bank2, bank3, bank4
- Item-013 in the setup menu
- Item-018 in the setup menu (HDW series only)
- M32 : RS-232C STATUS in the maintenance mode
- M37 : AUDIO CONFIG in the maintenance mode
- M38 : F-KEY CONFIG in the maintenance mode
- M39 : 50PIN DATA ASSIGN in the maintenance mode
- M3A : OUTPUT PHASE SELECT in the maintenance mode
- M40 : EXTENDED MENU in the maintenance mode
- M48 : AUTO BANK RECALL in the maintenance mode

Note

The hour meter reset is not performed in this menu. If necessary, perform M36 : HOUR METER RESET separately.

To execute

(1) Turn the MULTI CONTROL knob while pressing the HOME button to change the display from "OFF" to "ON".
  - The message "All the System Setup data will be changed to Factory default." is displayed on the superimposed display.

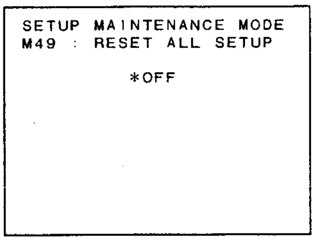
(2) Press the F5 (SET) button once.
  - The message "Executing..." is displayed during changing the setting.

(3) Check that the setting change is completed.
  - After the setting change is completed, the message "Complete" "Turn off/on POWER!!" is displayed on the superimposed display.

(4) Turn off the power.

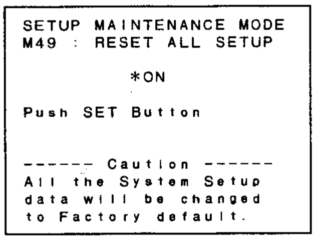
(5) Turn on the power again.

Example of display and operation



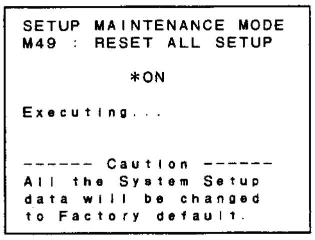
```
SETUP MAINTENANCE MODE
M49 : RESET ALL SETUP

        *OFF
```

(1) ⇩ HOME + MULTI CONTROL



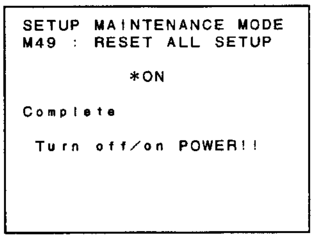
```
SETUP MAINTENANCE MODE
M49 : RESET ALL SETUP

        *ON

Push SET Button

------ Caution ------
All the System Setup
data will be changed
to Factory default.
```

(2) ⇩ F5(SET)



```
SETUP MAINTENANCE MODE
M49 : RESET ALL SETUP

        *ON

Executing...

------ Caution ------
All the System Setup
data will be changed
to Factory default.
```

(3) ⇩ Check



```
SETUP MAINTENANCE MODE
M49 : RESET ALL SETUP

        *ON

Complete

 Turn off/on POWER!!
```

(4) ⇩ Power OFF

(5) ⇩ Power ON

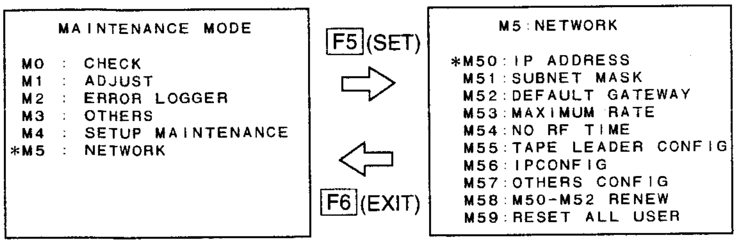
3-7. NETWORK Mode (M5)

3-7-1. Outline

M5 : NETWORK is used for basic settings on network.

Note

This mode is only for the e-VTR (MSW-M2000E/M2000EP/M2100E/M2100EP, MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E2000/E3000 Option Board mounted).


MAINTENANCE MODE
M0 : CHECK
M1 : ADJUST
M2 : ERROR LOGGER
M3 : OTHERS
M4 : SETUP MAINTENANCE
*M5 : NETWORK
F5 (SET)
F6 (EXIT)
M5 : NETWORK
*M50 : IP ADDRESS
M51 : SUBNET MASK
M52 : DEFAULT GATEWAY
M53 : MAXIMUM RATE
M54 : NO RF TIME
M55 : TAPE LEADER CONFIG
M56 : IPCONFIG
M57 : OTHERS CONFIG
M58 : M50-M52 RENEW
M59 : RESET ALL USER

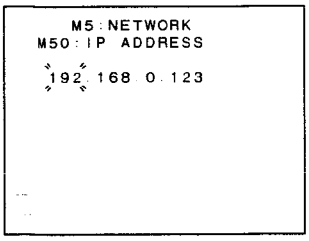
MAINTENANCE Mode **NETWORK Mode**

Title	Page	Description
M50 : IP ADDRESS	3-157	Sets the IP address.
M51 : SUBNET MASK	3-157	Sets the subnet mask.
M52 : DEFAULT GATEWAY	3-158	Sets the default gateway.
M53 : MAXIMUM RATE*	3-158	Sets the maximum data-transfer rate for the network.
M54 : NO RF TIME*	3-159	Sets the transfer processing for a non-recorded section of a tape.
M55 : TAPE LEADER CONFIG	3-159	Sets about the leader of a recording tape or file.
M550 : LEADER LENGTH	3-159	Selects the leader length of a recording tape.
M551 : LEADER TC	3-160	Specifies the starting time code of the first file to be recorded on a tape.
M552 : LEADER SIGNAL	3-160	Selects the type of video signal which is recorded on the leader of a recording tape or beginning of each file.
M56 : IPCONFIG	3-161	Displays the IP configuration.
M57 : OTHERS CONFIG*	3-161	Sets the other configuration about network.
M570 : REC WITHOUT TELE-F*	3-161	Sets whether to receive files of a cassette tape without memory label affixing.
M571 : DESTINATION IP REG*	3-162	Registers destination IP addresses used when file transfer using FTP is performed with VTR control panel.
M57 : OTHERS CONFIG	3-162	Sets the other configuration about network.
M570 : REC WITHOUT TELE-F	3-163	Sets whether to receive files of a cassette tape without memory label affixing.
M571 : REC WITH TELE-F	3-163	Sets whether to execute the REC command from the network for a cassette tape with a memory label.
M572 : TEMP FILE CREATE	3-164	Sets whether to create files when volume of files exceeds the memory label capacitor.
M58 : M50-M52 RENEW	3-164	Applies the changes to basic network settings (M50 - M52).
M59 : RESET ALL USER	3-165	Initializes registered user name and password.

*: Displayed for MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E2000 Option Board mounted.

3-7-2. IP ADDRESS Menu (M50)

This menu is used to modify an IP address for the network.



```
  M5 : NETWORK
M50 : IP  ADDRESS

192. 168. 0. 123
```

To execute the menu

(1) Turn the MULTI CONTROL knob to blink a value to be modified.

(2) While pressing HOME button, turn the MULTI CONTROL knob to modify the value.

(3) Press F5 (SET) button.

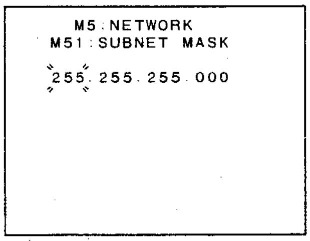
- "Saving..." is displayed. When the save is completed properly, the message turns into "Save Complete" in a few seconds.

(4) Press F6 (EXIT) button.

(5) Perform M58 : M50-M52 RENEW (refer to Section 3-7-11) to apply the changes of setting.

3-7-3. SUBNET MASK Menu (M51)

This menu is used to modify a subnet mask for the network.



```
  M5 : NETWORK
M51 : SUBNET  MASK

255. 255. 255. 000
```

To execute the menu

(1) Turn the MULTI CONTROL knob to blink a value to be modified.

(2) While pressing HOME button, turn the MULTI CONTROL knob to modify the value.

(3) Press F5 (SET) button.

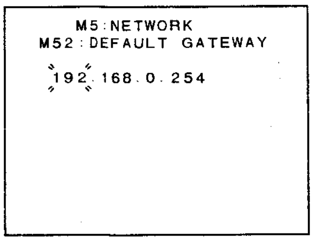
- "Saving..." is displayed. When the save is completed properly, the message turns into "Save Complete" in a few seconds.

(4) Press F6 (EXIT) button.

(5) Perform M58 : M50-M52 RENEW (refer to Section 3-7-11) to apply the changes of setting.

3-7-4. DEFAULT GATEWAY Menu (M52)

This menu is used to modify a default gateway for the network.



```
M5 : NETWORK
M52 : DEFAULT GATEWAY

192. 168. 0. 254
```

To execute the menu

(1) Turn the MULTI CONTROL knob to blink a value to be modified.
(2) While pressing HOME button, turn the MULTI CONTROL knob to modify the value.
(3) Press F5 (SET) button.
- "Saving..." is displayed. When the save is completed properly, the message turns into "Save Complete" in a few seconds.

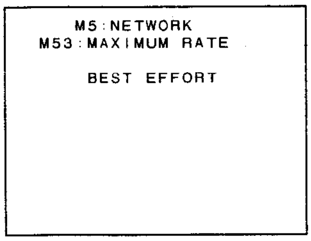
(4) Press F6 (EXIT) button.
(5) Perform M58 : M50-M52 RENEW (refer to Section 3-7-11) to apply the changes of setting.

3-7-5. MAXIMUM RATE Menu (M53)

Note

M53 : MAXIMUM RATE is displayed in MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E2000 Option Board mounted.

This menu is used to modify the maximum data-transfer rate set in the VTR unit for the network.



```
M5 : NETWORK
M53 : MAXIMUM RATE

BEST EFFORT
```

To execute the menu

(1) Turn the MULTI CONTROL knob to display a desired transfer rate.

BEST EFFORT (factory setting) :	Transfers data at the maximum transfer rate.
1 Mbps to 50 Mbps :	Limit the data transfer rate to the specified value.

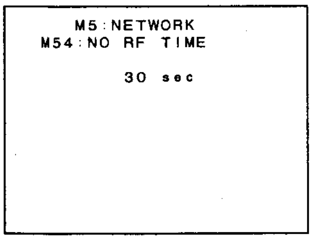
(2) Press F5 (SET) button.
- The display turns into "Save Complete".

3-7-6. NO RF TIME Menu (M54)

Note

M54 : NO RF TIME is displayed in MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E2000 Option Board mounted.

If the material transfer range is from the tape top to the tape end (transfer of the virtual file &whole.mxf), or from the current position to the tape end (transfer of the virtual file &current.mxf), you can stop the transfer automatically when a non-recorded section is played back countituously for a specific length of time.
This menu is used to modify the length of time from the detected point of the non-recorded section to the automatic stop of the transfer.



M5 : NETWORK
M54 : NO RF TIME

30 sec

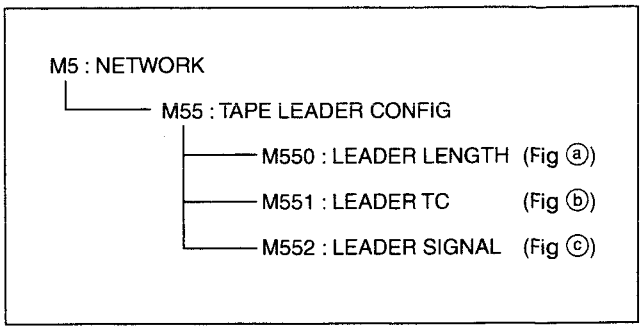
To execute the menu

(1) Turn the MULTI CONTROL knob to set the time between the detected point of the non-recorded section and the automatic stop of the transfer.
Setting range : 5 sec to 30 min
(Factory setting : 30 sec)

(2) Press F5 (SET) button.
- The display turns into “Save Complete”.

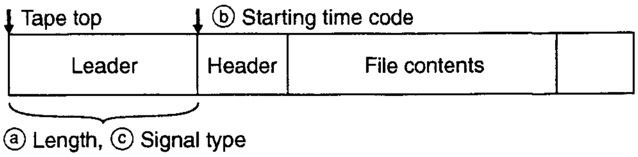
3-7-7. TAPE LEADER CONFIG Setting Mode (M55)

This mode is used to set about the leader of the recording tape or file.



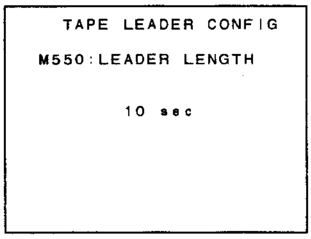
M5 : NETWORK
M55 : TAPE LEADER CONFIG
M550 : LEADER LENGTH (Fig ⓐ)
M551 : LEADER TC (Fig ⓑ)
M552 : LEADER SIGNAL (Fig ⓒ)

Menu Tree of TAPE LEADER CONFIG Mode



Tape top
ⓑ Starting time code
Leader
Header
File contents
ⓐ Length, ⓒ Signal type

M550 : LEADER LENGTH



TAPE LEADER CONFIG
M550 : LEADER LENGTH

10 sec

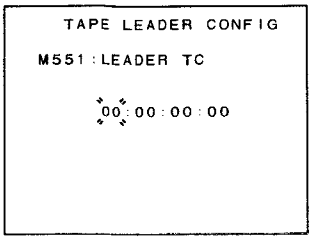
This menu is used to set the leader length at tape top of a recording tape.

To execute

(1) Turn the MULTI CONTROL knob to display the desired leader length among the followings:
10 sec, 30 sec, 1 min, 2 min
(Factory Setting: 10 sec)

(2) Press F5 (SET) button.
- The display changes to “Save Complete”.

M551 : LEADER TC



TAPE LEADER CONFIG
M551 : LEADER TC
00 : 00 : 00 : 00

This menu is used to set a starting time code of the first file to be recorded on a tape.

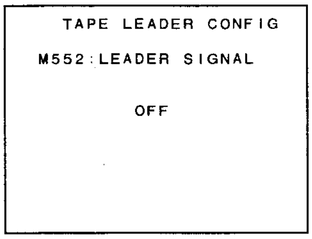
Note

When the setup menu ITEM-625 (TCG NETWORK REGEN MODE) is set to "on", the time code value of five seconds (header recording time) before a starting time code of a received file is set as a starting time code of the file .

To execute

(1) Turn the MULTI CONTROL knob to blink a value to be modified.
(2) While pressing HOME button, turn the MULTI CONTROL knob to modify the value.
(3) Press F5 (SET) button.
- The display changes to "Save Complete".

M552 : LEADER SIGNAL



TAPE LEADER CONFIG
M552 : LEADER SIGNAL
OFF

This menu is used to select the type of video signal which is recorded on the leader of a recording tape and beginning of each file.

OFF :	Records the Black Burst signal. (Factory setting)
Other than OFF :	Records the signal selected from the followings: 100% Color Bars/75% Color Bars/75% Reverse Color Bars/Bowtie/Pulse and Bars/Multi Burst/H Sweep/5step/Ramp/ Shallow Ramp/Red Signal/50% Flat/ 100% Flat/Pathological Check Code/ NTC7(525)*1/LN330(625)*2

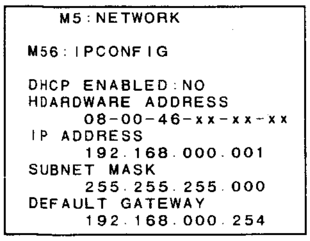
*1 : For the 525 mode only
*2 : For the 625 mode only

To execute

(1) Turn the MULTI CONTROL knob to display the desired recording signal.
(2) Press F5 (SET) button.
- The display changes to "Save Complete".

3-7-8. IPCONFIG Display Menu (M56)

This menu displays the IP configuration.



```
      M5:NETWORK

M56:IPCONFIG

DHCP ENABLED:NO
HDARDWARE ADDRESS
       08-00-46-xx-xx-xx
IP ADDRESS
       192.168.000.001
SUBNET MASK
       255.255.255.000
DEFAULT GATEWAY
       192.168.000.254
```

Description of superimposed display

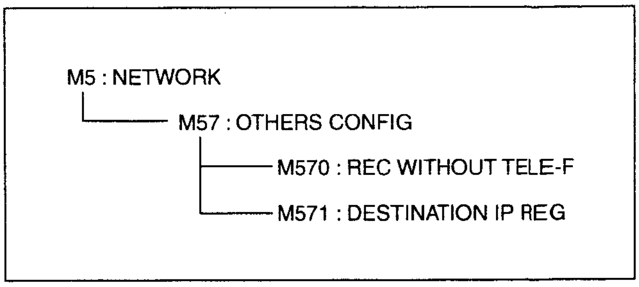
DHCP ENABLED :	Setting for automatic acquisition of IP address
HARDWARE ADDRESS :	Hardware address of the VN-13 board
IP ADDRESS :	IP address assigned to VTR
SUBNET MASK :	Subnet mask of connected network
DEFAULT GATEWAY :	IP address of default gateway of connected network

3-7-9. OTHERS CONFIG Setting Mode (M57) (For BKMW-E2000)

Note

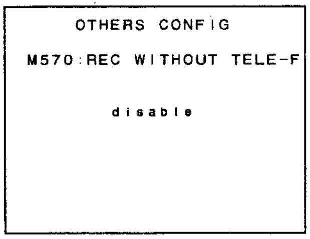
This menu is used for MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E2000 Option Board mounted.

This menu is used for setting about file transfer using FTP and others.



Menu Tree of OTHERS CONFIG Mode

M570 : REC WITHOUT TELE-F



```
     OTHERS CONFIG

M570:REC WITHOUT TELE-F

        disable
```

This menu is used to set whether or not to receive files of a cassette tape without memory label affixing.
In the case of a cassette without a memory label, the e-VTR begins recording the signals of video, audio and metadata from the tape position at the time FTP command is received as a starting point of recording of the received file.

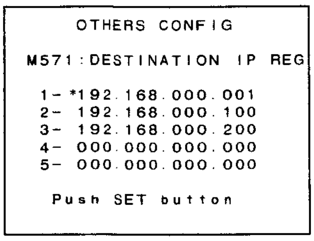
To execute

(1) Turn the MULTI CONTROL knob to display the desired setting.

enable :	Recording of transferred files to the tape is enabled even when a cassette with no memory label is inserted in the e-VTR.
disable :	Recording of transferred files to the tape is disable when a cassette with no memory label is inserted in the e-VTR. (Factory setting)

(2) Press F5 (SET) button.
- The display changes to "Save Complete".

M571 : DESTINATION IP REG



```
        OTHERS CONFIG

M571 : DESTINATION IP REG

 1- *192.168.000.001
 2-  192.168.000.100
 3-  192.168.000.200
 4-  000.000.000.000
 5-  000.000.000.000

     Push SET button
```

When FTP file transfer with the control panel of the e-VTR is enabled, this menu is used to register IP addresses as transfer destinations.
Up to five addresses can be registered.

Note

To transfer a file using FTP with a control panel of e-VTR, entering a user name and password of the transfer destination from the Web window is required. For details, refer to the BKMW-E2000 Operation Manual.

To execute

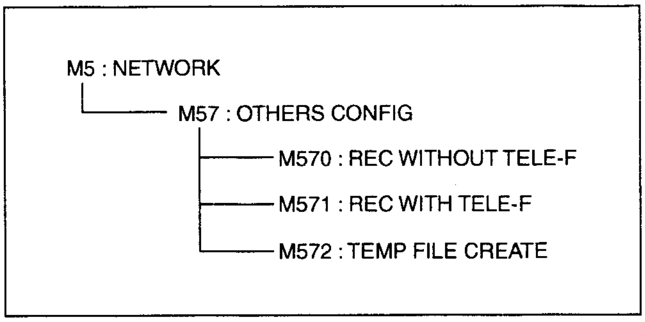
(1) Turn the MULTI CONTROL knob to position the cursor (*) to the desired number, and turn the MULTI CONTROL knob while pressing the HOME button to set the IP address.
(2) Press F5 (SET) button.
- The display changes to "Save Complete".

3-7-10. OTHERS CONFIG Setting Mode (M57) (For BKMW-E3000, MSW-M2000E/M2000EP/M2100E/M2100EP)

Note

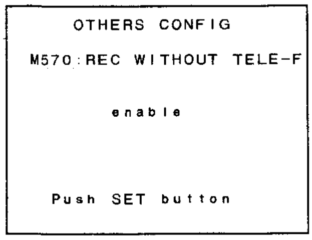
This menu is used for MSW-M2000E/M2000EP/M2100E/M2100EP, and MSW-2000/A2000/A2000P/M2000/M2000P/M2100/M2100P with BKMW-E3000 Option Board mounted.

This menu is used for setting about file transfer using FTP and others.



Menu Tree of OTHERS CONFIG Mode

M570 : REC WITHOUT TELE-F



```
OTHERS CONFIG
M570:REC WITHOUT TELE-F

enable


Push SET button
```

This menu is used to set whether or not to receive files of a cassette tape without memory label affixing.
In the case of a cassette without a memory label, the e-VTR begins recording the signals of video, audio and metadata from the tape position at the time FTP command is received as a starting point of recording of the received file.

To execute

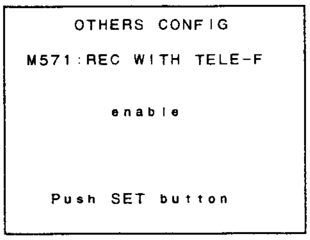
(1) Turn the MULTI CONTROL knob to display the desired setting.

enable :	Recording of transferred files to the tape is enabled even when a cassette with no memory label is inserted in the e-VTR. (Factory setting)
disable :	Recording of transferred files to the tape is disable when a cassette with no memory label is inserted in the e-VTR.

(2) Press F5 (SET) button.

- The display changes to "Save Complete".

M571 : REC WITH TELE-F



```
OTHERS CONFIG
M571:REC WITH TELE-F

enable


Push SET button
```

This menu is used to set whether the REC command is executable or not from the network for a tape with a memory label affixed.

To execute

(1) Turn the MULTI CONTROL knob to display a desired setting.

enable:	Enables to execute the REC command from the network for a tape with a memory label, provided that no file is created.
disable:	Disables to execute the REC command from the network for a tape with a memory label. (Factory setting)

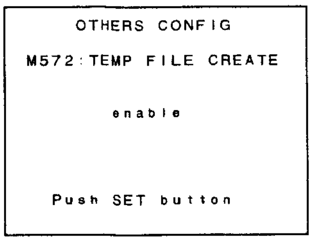
(2) Press F5 (SET) button.

- The display changes to "Save Complete".

Note

The setting at the time of factory shipping is "disable" because the recording condition of files recorded on the tape may be damaged.

M572 : TEMP FILE CREATE



```
OTHERS CONFIG
M572:TEMP FILE CREATE

enable

Push SET button
```

This menu is used to set whether a file exceeding the memory label capacity can be created or not.

To execute

(1) Turn the MULTI CONTROL knob to display a desired setting.
enable: Enables to create a file exceeding the memory label capacity.
disable: Disables to create a file exceeding the memory label capacity. (Factory setting)

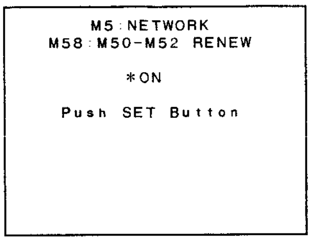
(2) Press F5 (SET) button.
- The display changes to "Save Complete".

Note

When file capacity exceeds the memory label capacity, files created after that are temporary files.
For details, refer to "VTR Window Configuration" in the BKMW-E3000 or MSW-M2000E/M2000EP/M2100E/M2100EP Operation Manual.

3-7-11. M50-M52 RENEW Menu (M58)

This menu is used to apply the change of the basic network-setting (M50 - M52) without restarting the VTR.



```
M5:NETWORK
M58:M50-M52 RENEW

*ON

Push SET Button
```

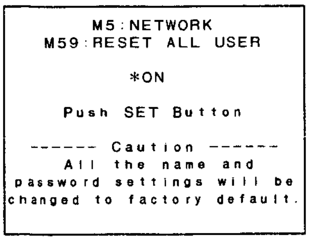
To execute the menu

(1) Turn the MULTI CONTROL knob to "ON".

(2) Press F5 (SET) button.
- "Executing..." is displayed. When the execution is completed properly, the message turns into "Complete" in a few seconds.

3-7-12. RESET ALL USER Menu (M59)

This menu is used to reset all registered user names and passowords to the factory (default) setting.



```
M5 : NETWORK
M59 : RESET ALL USER

*ON

Push SET Button

------ Caution ------
All the name and
password settings will be
changed to factory default.
```

To reset

Note

When the reset is performed by pressing F5 (SET) button, the previous setting cannot be restored.

(1) While pressing HOME button, turn the MULTI CONTROL knob to "ON".
  - When cancelling this setting, press F6 (EXIT) button to close this menu.

(2) Press F5 (SET) button.
  - "Complete" and "Turn off/on POWER!!" are displayed.

(3) Turn off the power.

(4) Turn on the power again.

Factory (default) setting

User	UID	User name	Password
Super User	0	e-vtr	e-vtr
General User	1	User1	(None)
	2	User2	(None)
	3	User3	(None)
	4	User4	(None)

Note

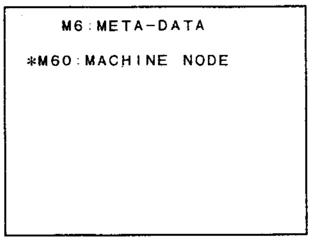
To register a new user name and a password, refer to "Maintenance Page Operations" in the Operation Manual.

3-8. META-DATA mode (M6)

3-8-1. Overview

M6 : This mode is used for meta data (UMID) recording.

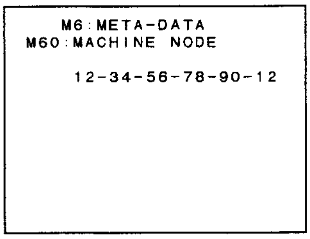
Displays for models having UMID recording function only.
For details of the UMID function, refer to the Operation Manual.



```
M6 : META-DATA

*M60 : MACHINE NODE
```

3-8-2. MACHINE NODE display menu (M60)

(Example)



```
M6 : META-DATA
M60 : MACHINE NODE

12-34-56-78-90-12
```

Displays MACHINE NODE that is set in the unit.
MACHINE NODE is set when the unit is shipped.

- MACHINE NODE cannot be changed.
- When "xx-xx-...-xx" is displayed, MACHINE NODE is not set.
  UNID cannot be recorded in this state.

Section 4
Periodic Maintenance and Inspection

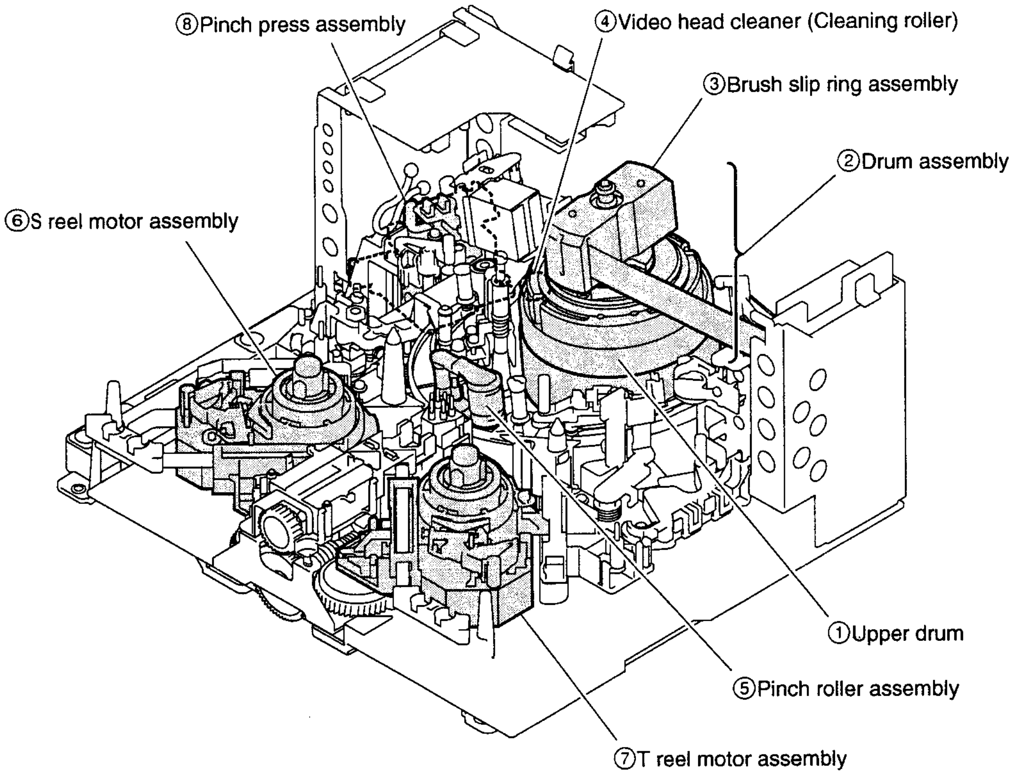
This section explains about periodic maintenance and how to clean.

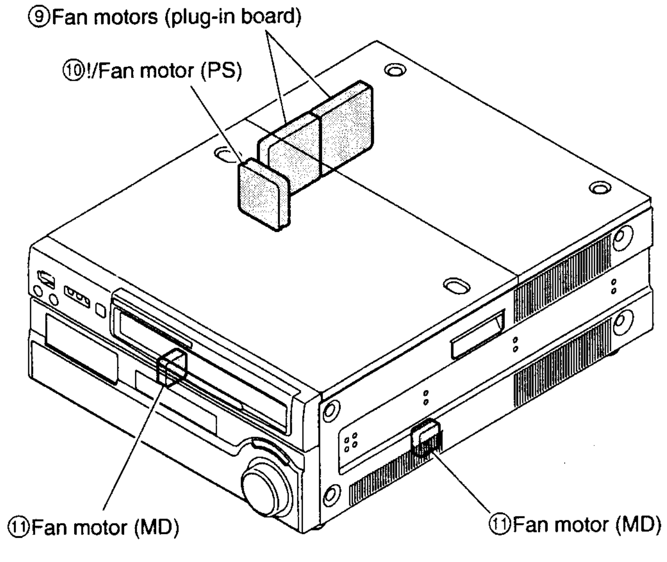
4-1. Periodic Maintenance

To make the most of the functions, fully realize the performances of this unit and to lengthen the life of the unit, periodic check and parts replacement are recommended.

4-1-1. Index

It is necessary to check and replace periodically to the following parts.
The numbers in the illustration correspond to the table in the next page.


⑧Pinch press assembly
④Video head cleaner (Cleaning roller)
③Brush slip ring assembly
②Drum assembly
⑥S reel motor assembly
①Upper drum
⑤Pinch roller assembly
⑦T reel motor assembly


⑨Fan motors (plug-in board)
⑩!/Fan motor (PS)
⑪Fan motor (MD)
⑪Fan motor (MD)

4-1-2. Periodic Replacement and Check Item Table

The replacement time shown in the following table is not the guarantee term of parts. The replacement time of parts varies depending on the operating environment and conditions of the unit.
Especially the pinch roller and cleaners, may be required replacing earlier than replacement period shown in the table depending on the degree of their dirt or abrasion.
As for the hours meter, refer to Section 4-1-3.
As for replacing each part, refer to Section 5.

Symbols in table
R: Replace the part.
⇩ (or ⇧): Indicates replaced together with part shown below or above in the same column.

No.	Replacement parts	(Menu No.)	Replacement period (1000h) 1	2	3	4	5	6	Reference (Section)	Part No. /Part Name	Q'ty
①	Upper drum	Drum rotating time (H02)	– Replace when used 3000 hours	–	R	–	–	R⇩	5-2 (Note: Sec. 9)	HDW-2000/D2000: A-8327-911-A UPPER DRUM DJR-28A-R	1
										HDW-M2000/P, S2000/P: MSW-A2000/P, M2000/P, M2000E/P: A-8325-096-C UPPER DRUM DJR-26B-R	1
										HDW-M2100/P: A-8329-653-A UPPER DRUM DJR-33A-R	1
										DVW-2000/P: A-8347-935-A UPPER DRUM DJR-39A-R	1
										DVW-M2000/P: A-8347-933-A UPPER DRUM DJR-37A-R	1
										MSW-2000: A-8345-577-A UPPER DRUM DJR-35A-R	1
										MSW-M2100/P, M2100E/P: A-8327-727-A UPPER DRUM DJR-32A-R	1

(continued)

			Replacement period (1000h)						Reference		
No.	**Replacement parts**	**(Menu No.)**	**1**	**2**	**3**	**4**	**5**	**6**	**(Section)**	**Part No. /Part Name**	**Q'ty**
②	Drum assembly[*1]	Drum rotating time	–	–	–	–	–	R	5-3	HDW-2000/D2000: A-8327-909-A DRUM DJH-28A-R	1
		(H02)	Replace when used 6000 hours						(Note: Sec. 9)		
										HDW-M2000/P, S2000/P: MSW-A2000/P, M2000/P, M2000E/P: A-8325-095-B DRUM DJH-26B-R	1
										HDW-M2100/P: A-8329-651-A DRUM DJH-33A-R	1
										DVW-2000/P: A-8347-931-A DRUM DJR-39A-R	1
										DVW-M2000/P: A-8347-929-A DRUM DJH-37A-R	1
										MSW-2000: A-8345-576-A DRUM DJH-35A-R	1
										MSW-M2100/P, M2100E/P: A-8327-726-A DRUM DJH-32A-R	1
③	Brush slip ring assembly	Drum rotating time	–	–	R⇧	–	–	R⇧	5-4	HDW-M2000/P, S2000/P, M2100/P: DVW-M2000/P: MSW-A2000/P, M2000/P, M2000E/P, M2100/P, M2100E/P: A-8267-571-C RING (13) ASSY (RP), BRUSH SLIP	1
		(H02)	Replace when used 3000 hours								
										HDW-2000/D2000: DVW-2000/P: MSW-2000: A-8320-032-C RING (9) ASSY (RP), BRUSH SLIP	1
④	W cleaner	Drum rotating time	–	–	R	–	–	R	5-5	A-8325-415-A	1
	(Cleaning roller)	(H02)	Replace when used 3000 hours							CLEANER ASSY (RP)	
⑤	Pinch roller	Tape running time	–	–	R	–	–	R	5-9	X-3167-054-5	1
	assembly	(H03)	Replace when used 3000 hours							ASSY, PINCH ARM	
⑥	S reel motor assembly	Tape running time	–	–	–	–	–	R	5-14	A-8325-412-A	1
		(H03)	Replace when used 6000 hours							BLOCK (S) ASSY (RP), RM	
⑦	T reel motor assembly	Tape running time	–	–	–	–	–	R	5-14	A-8325-413-A	1
		(H03)	Replace when used 6000 hours							BLOCK (T) ASSY (RP), RM	
⑧	Pinch press assembly	Tape running time	–	–	–	–	–	R	5-10	A-8324-938-A	1
		(H03)	Replace when used 6000 hours							PRESS ASSY, PINCH	
⑨	Fan motor	Energized time	Replace when used						5-25-1	1-763-495-11	2
	(For plug-in board)	(H01)	40,000 hours							FAN, DC (80 SQUARE)	
⑩	Fan motor	Energized time	Replace when used						5-25-2	1-787-142-11	1
	(For power unit)	(H01)	40,000 hours							FAN, DC (60 SQUARE)	
⑪	Fan motor	Energized time	Replace when used						5-25-3	1-763-538-12	2
	(For mecha deck)	(H01)	40,000 hours							FAN, DC (30 SQUARE)	

*1: Drum assembly includes the upper drum and the brush slip ring assembly.

Replace the parts shown in the table below periodically when the threading/unthreading operation is repeated frequently.

Replacement parts	Hours meter (Menu No.)	Replacement period	Reference (Section)	Part No. /Part Name	Q'ty
Gear box assembly	Threading times (H04)	200,000 times	5-19	A-8325-414-A BOX, ASSY GEAR (RP)	1
Threading ring assembly	Threading times (H04)	200,000 times	5-20	A-8324-937-F RING ASSY	1
Ring roller	Threading times (H04)	200,000 times	5-20	3-180-677-01 ROLLER, RING	2
				3-180-679-01 ROLLER (B), RING	1
S tension regulator	Threading times (H04)	200,000 times	5-21	A-8325-409-A REGULATOR ASSY (RP), S TENSION	1
T tension regulator	Threading times (H04)	200,000 times	5-22	A-8325-410-A T TEN ASSY (RP)	1
T drawing arm assembly	Threading times (H04)	200,000 times	5-23	A-8325-411-A DRAWER ASSY (RP), T	1
Pinch arm guard	Threading times (H04)	200,000 times	5-20	3-625-217-01 GUARD, PA	1
CL guide rail	Threading times (H04)	200,000 times	5-8	3-624-986-01 RAIL, GUIDE, CL	1
Cassette compartment assembly	Threading times (H04)	200,000 times	1-5	A-8345-471-C CASSETTE COMPARTMENT ASSY (M)	1

4-1-3. Hours Meter

This unit can display an hours meter on the menu display area of the lower control panel. Perform a periodic check with this hours meter as a reference.

1. Contents of display

Menu No.	Menu display	Item	Contents
H01	OPE HOURS	OPERATION HOURS	Sum of energized time
H02	DRUM HOURS	DRUM RUNNING HOURS	Sum of drum rotating time
H03	TAPE HOURS	TAPE RUNNING HOURS	Sum of tape running time
H04	THRED COUNT	THREADING COUNTER	Sum of threading
H12	DRUM HOURS r	DRUM RUNNING HOURS	Sum of drum rotating time (Resettable)
H13	TAPE HOURS r	TAPE RUNNING HOURS	Sum of tape running time (Resettable)
H14	THRED COUNTr	THREADING COUNTER	Sum of threading (Resettable)

2. Display procedure

1. Press the HOME button to display the function menu HOME1 page at the menu display area.
2. Press the F5 (MENU) button to display the setup menu at the menu display area.
3. Rotate the MULTI CONTROL knob to display the desired item to be checked at the menu display area.
   At the same time, the hours meter value will be displayed at the menu display area.

   Notes

   - Use the ▲ and ▼ buttons to move the ITEM by category.
   - To check the hours meter value on the video monitor, rotate the MULTI CONTROL knob to set the cursor (∗ mark) to the desired ITEM to be checked, and press the F2 (DETAIL) button.
     To check the hours meter value of the other items, press the F1 (ITEM) and rotate the MULTI CONTROL knob.

4. To exit the setup menu, press the F6 (EXIT) button.

4-2. Cleaning

To make the most of the functions, fully realize the performance of this unit, and to lengthen the life of the unit and tape, clean the components often.

4-2-1. Cleaning using Cleaning Tape

If the video heads are clogged, clean the video head as the following procedure. Make sure to use the specified cleaning tape. If other tape is used, unusual abrasion or damage of the video heads may occur.

Specified cleaning tape: BCT-HD12CL

Procedure

1. Insert the cleaning tape BCT-HD12CL into the unit.
   At the same time, the cleaning tape is played back for approx. 5 seconds. After that, the cleaning tape will be ejected automatically.
   Notes
   - If the cleaning tape is not ejected after playing back more than 5 seconds, press the EJECT button immediately to eject the cleaning tape.
   - Do not fast-forward or rewind the cleaning tape and leave it into the unit in the STOP mode to avoid damage to the video head.

2. Check to see that the head clogging is clear.

If the video heads are still clogged after cleaning using a cleaning tape, clean them using a cleaning cloth. (Refer to Section 4-2-3.)

4-2-2. General Information for Cleaning using Cleaning Cloth

1. Precautions

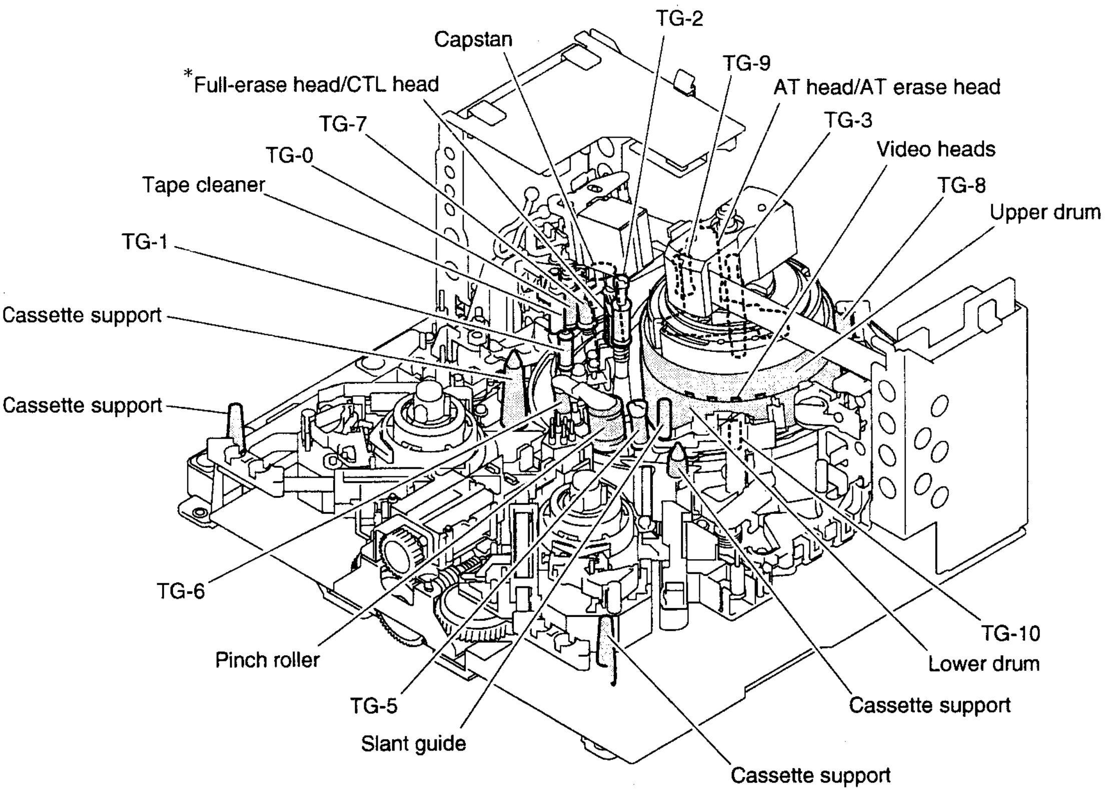
- Be sure to turn the power off before cleaning.
- Each block in the mechanical deck consists of a precision part and is adjusted precisely. Be careful not to damage each part and to apply an excessive force during cleaning.
- Do not contact the greased portions during cleaning. If the grease smears to a cleaning cloth, use a new cloth to avoid allow the grease to contact places where it should not.
- Do not insert a cassette tape before a cleaning fluid completely evaporates after cleaning.

2. Preparation

1. Turn the power off.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to a figure in Section 5-1-2.)

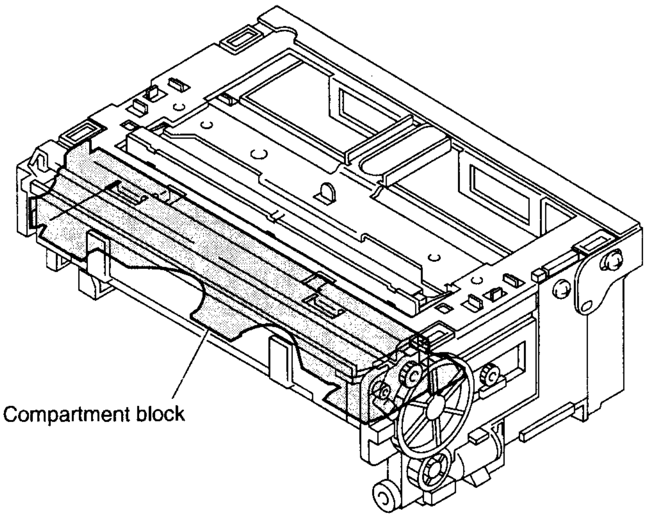
3. Cleaning Parts

Mechanical deck block


TG-2
Capstan
TG-9
*Full-erase head/CTL head
AT head/AT erase head
TG-7
TG-3
TG-0
Video heads
Tape cleaner
TG-8
Upper drum
TG-1
Cassette support
Cassette support
TG-6
TG-10
Pinch roller
Lower drum
TG-5
Cassette support
Slant guide
Cassette support

*: The full-erase head is not used in the player.

Cassette compartment


Compartment block

4-2-3. Tape Running Surface of Upper Drum and Video Heads Cleaning

WARNING

Never contact the rotating drum.
Be sure to turn off the power and wait until the drum comes to a complete stop before cleaning.

Precaution

The video heads are the part that can be damaged easily. Be careful not to damage the video heads during cleaning.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Note

Never use a cotton swab to clean the video heads.

Procedure

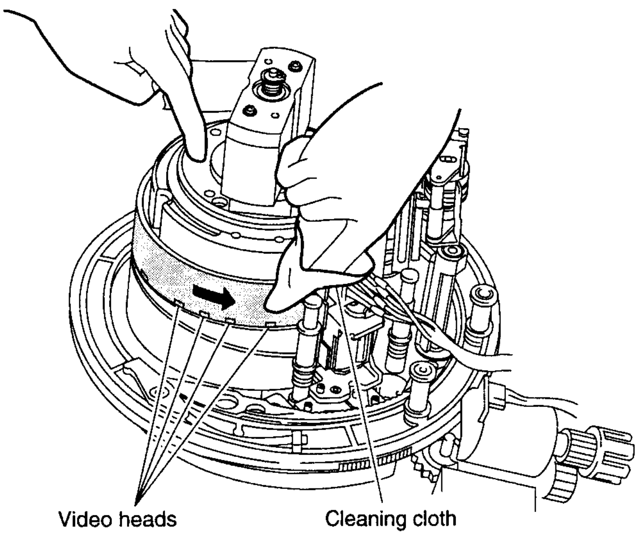
1. Hold the cleaning cloth moistened with a cleaning fluid keeping it without becoming wrinkled. And then slightly press the cleaning cloth against the video heads.

2. Slowly rotate the upper drum counterclockwise two or three turns and clean the tape-running surface and video heads without moving the cleaning cloth.

   Note

   Be sure to rotate the upper drum counterclockwise and clean the video heads along the circumference. Do not rotate it in the opposite direction (clockwise) or clean the video heads in the vertical direction to avoid damaging the video heads and brush slip ring assembly.

3. After cleaning, wipe them using a dry cleaning cloth two or three times.



Video Heads Cleaning

4-2-4. Tape Running Surface of Lower Drum and Lead Surface Cleaning

Precaution

Be careful not to damage the lower drum (especially lead surface) during cleaning. Pay careful attention when cleaning the edge portion above the lower drum because it is located near the video heads.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01
- Skewer or an equivalent (Not metallic)

Procedure

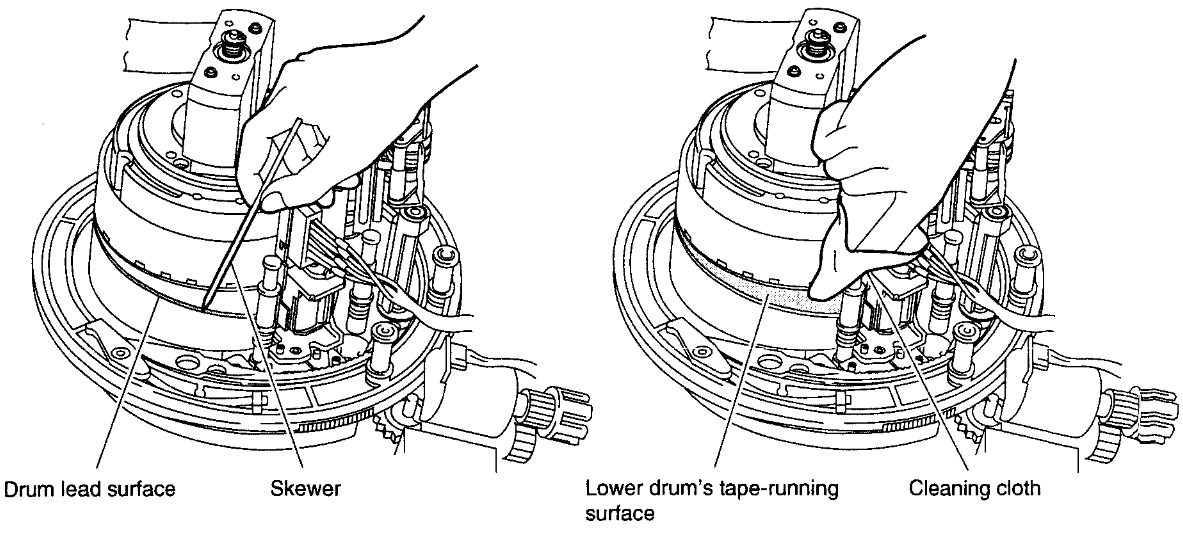
1. As shown in the figure, remove the magnetic powder using a skewer, running the skewer on the drum lead surface.

   Notes

   - Never use a metallic skewer to avoid damaging the tape-running surface.
   - Be sure to remove the magnetic powder completely. Tracking may be badly influenced if magnetic powder attaches to the drum lead surface.

2. Clean the drum lead surface and lower drum's tape-running surface (shaded portion in the figure) using a cleaning cloth moistened with a cleaning fluid.

3. After cleaning, wipe them using a dry cleaning cloth two or three times.



Tape-running Surface of Lower Drum and Lead Surface Cleaning

4-2-5. Stationary Heads Cleaning

Precaution

Be careful not to damage the head surface when cleaning the stationary heads.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

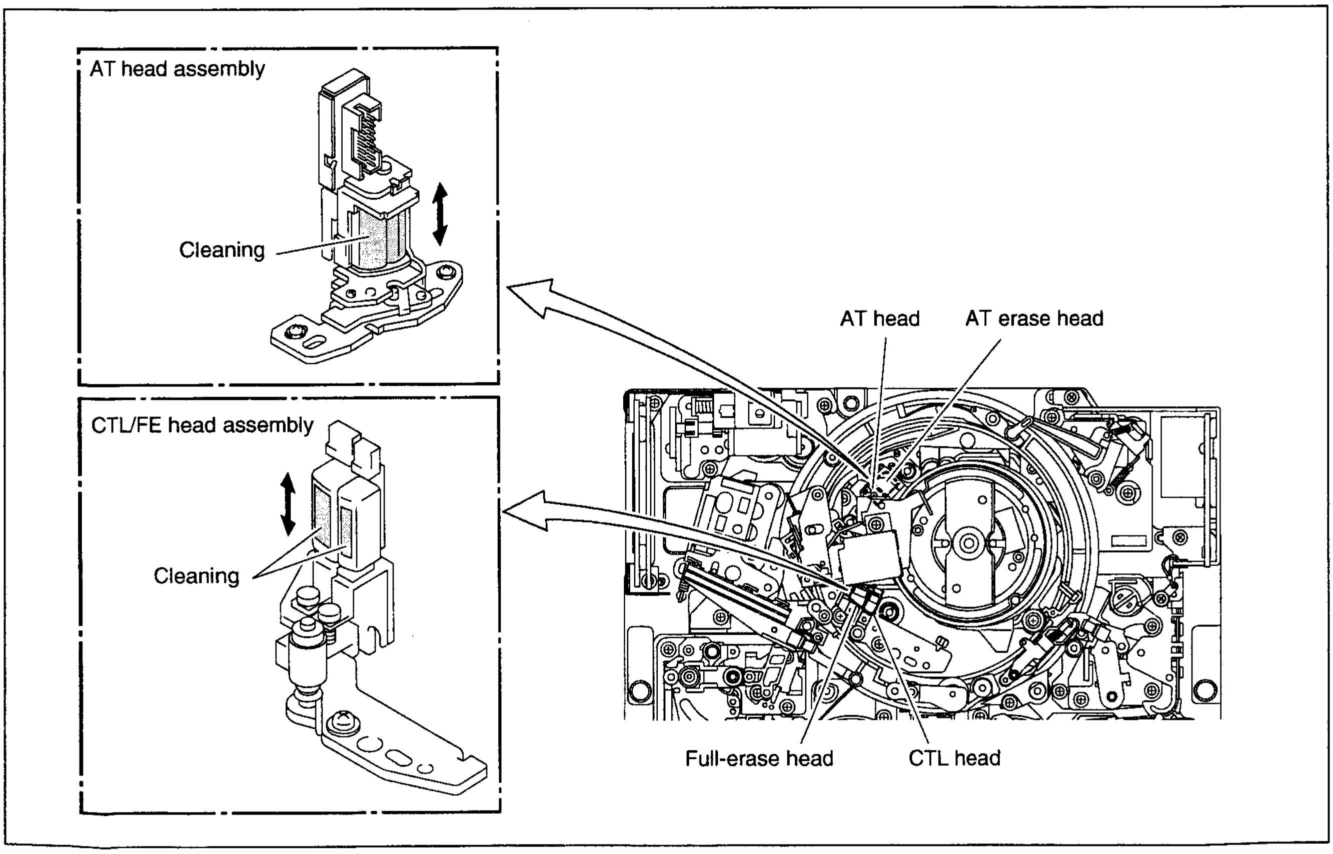
Procedure

1. Clean the tape-running surfaces (shaded portion in the figure)of the AT, AT erase, CTL, and full erase heads in the vertical direction using a cleaning cloth moistened with a cleaning fluid.

   Note

   Be sure to remove the magnetic powder completely.
   An error may occur in the recording or playback if magnetic powder attaches to the head gap portion of the AT, AT erase, CTL, and full-erase heads.

2. After cleaning, wipe them using a dry cleaning cloth two or three times.


AT head assembly
Cleaning
CTL/FE head assembly
Cleaning
AT head
AT erase head
Full-erase head
CTL head

Stationary Heads Cleaning

4-2-6. Tape Running System and Tape Cleaner Cleaning

WARNING

Keep bare hands away from the sharp edge of the tape cleaner to avoid cuts and injuries.

Pay careful attention when cleaning the tape cleaner.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Procedure

1. Wipe off the surfaces of the tape cleaner using paper (such as paper for a copy machine) to remove the magnetic powder adhered on the tape cleaner.

   WARNING

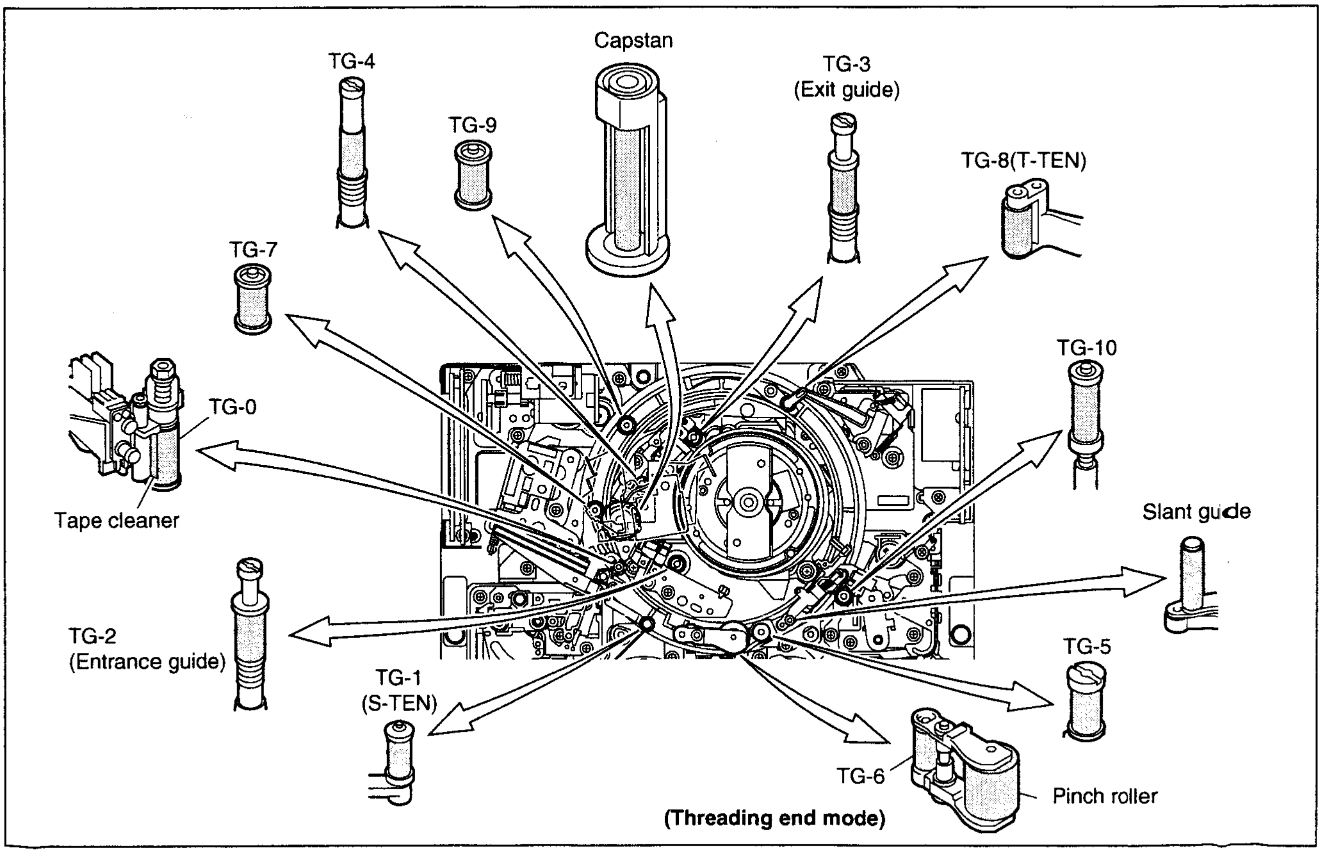
   Do not contact the edge portion of the tape cleaner with bare hands.

   Note

   Do not apply an excessive force to the tape cleaner to avoid damaging it.

2. Clean the tape-running surfaces (shaded portions in the figure) of each guide and the tape cleaner using cleaning cloth moistened with a cleaning fluid.

3. After cleaning, clean them using a dry cleaning cloth two or three times.


TG-4
Capstan
TG-3
(Exit guide)
TG-9
TG-8(T-TEN)
TG-7
TG-10
TG-0
Tape cleaner
Slant guide
TG-2
(Entrance guide)
TG-1
(S-TEN)
TG-5
TG-6
Pinch roller
(Threading end mode)

Tape-running System and Tape Cleaner Cleaning

4-2-7. Cassette Compartment and Cassette Supports Cleaning

Precautions

- Being careful not to apply an excessive force to the compartment block or mirror, clean the cassette compartment.
- Do not use an alcoholic chemical in cleaning of the door and mirror to avoid cracking them.

Tools

- Cloth (or Gauze)
- Vacuum cleaner

Procedure

1. Remove the cassette compartment from the unit. (Refer to Section 1-5.)

2. Remove the dust on the cassette compartment from the cassette insertion inlet using a vacuum cleaner.

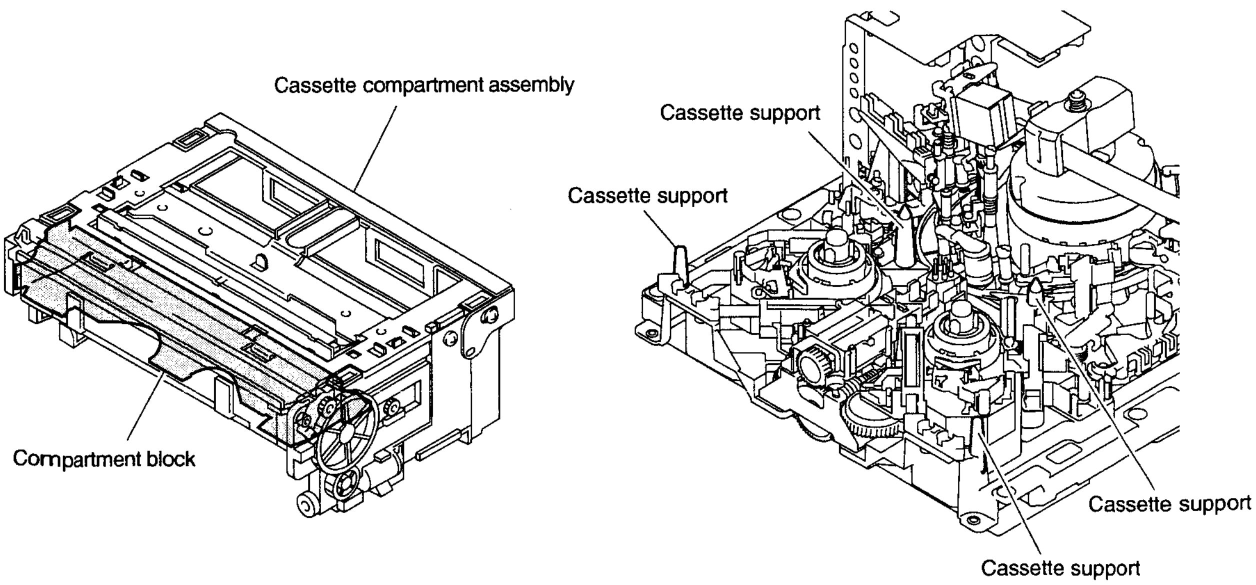
3. Clean the compartment (shaded portion in the figure) using a dry cloth (or gauze).

   Note

   Do not apply an excessive force to the compartment block.

4. Clean the four cassette supports on the mechanical deck using a dry cloth (or gauze).

5. Reattach the cassette compartment. (Refer to Section 1-5.)


Cassette compartment assembly
Compartment block
Cassette support
Cassette support
Cassette support
Cassette support

Cassette Compartment Cleaning

Section 5
Replacement of Main Parts

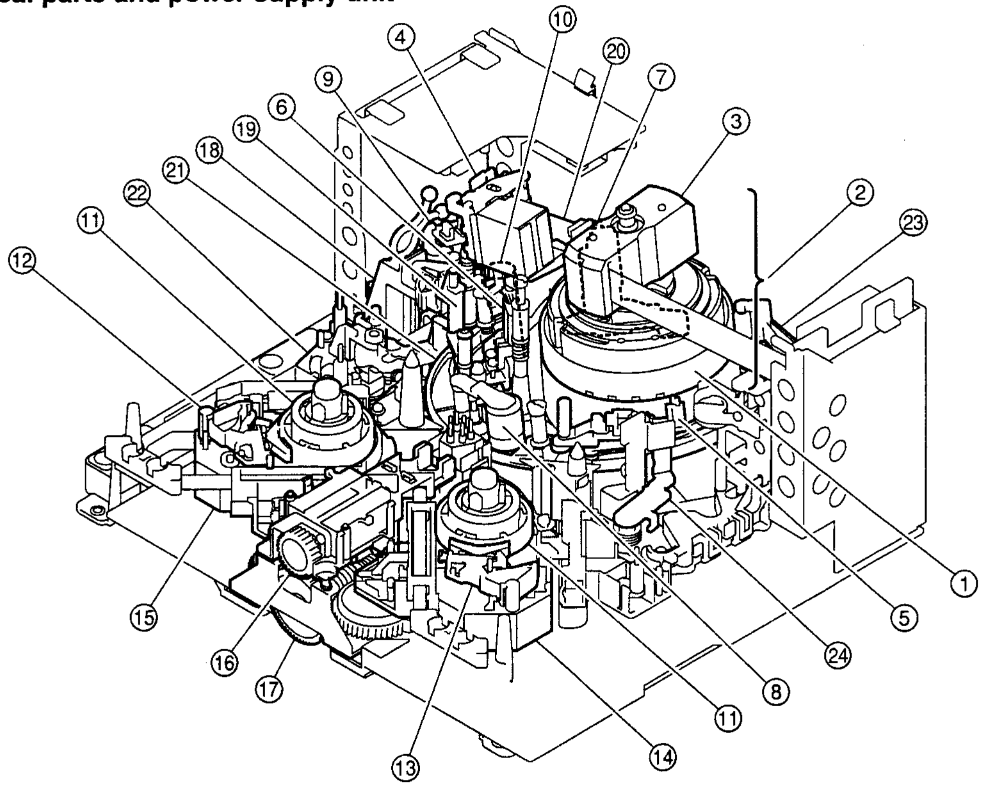
This section explains the replacement procedures of periodic replacement parts, main mechanical parts, power supply unit, and circuit boards.

5-1. General Information for Parts Replacement

5-1-1. Index

The parts that are explained each replacement procedure in Section 5 are as shown in the below.

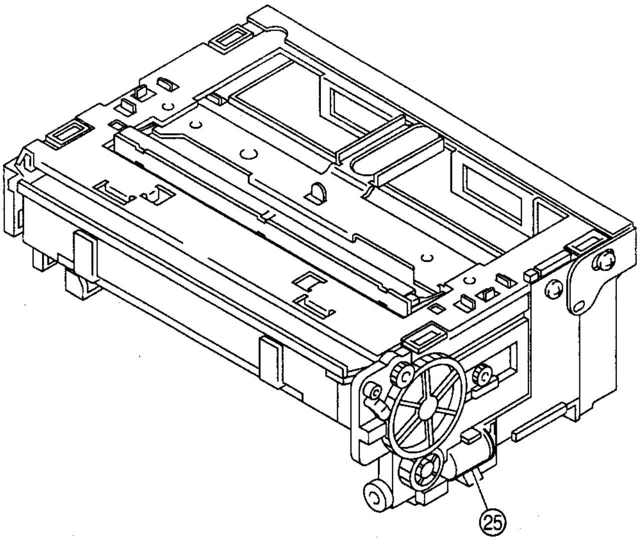
(1) Mechanical parts and power supply unit



No.	Part Name	Section
①	Upper Drum Assembly	5-2
②	Drum Assembly	5-3
③	Brush Slip Ring Assembly	5-4
④	W Cleaner Assembly	5-5
⑤	AT Head Cleaner	5-6
⑥	CTL/FE Head Assembly	5-7
⑦	AT Head Assembly	5-8
⑧	Pinch Roller	5-9
⑨	Pinch Press Assembly	5-10
⑩	Capstan Motor	5-11
⑪	Reel Table Assembly	5-12
⑫	Brake Assembly (S)	5-13
⑬	Brake Assembly (T)	5-13

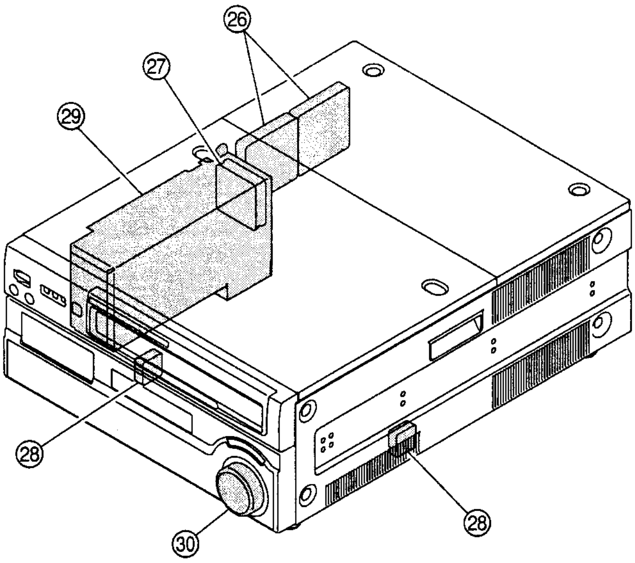
No.	Part Name	Section
⑭	Reel Motor Assembly (S)	5-14
⑮	Reel Motor Assembly (T)	5-14
⑯	Motor Holder Assembly	5-15
⑰	Worm Assembly	5-16
–	Tape Guide	5-17
⑱	S Plate Assembly	5-17-1
⑲	Tape Cleaner	5-18
⑳	Gear Box Assembly/Threading Motor	5-19
㉑	Threading Ring Assembly	5-20
㉒	S Tension Regulator Assembly	5-21
㉓	T Tension Regulator Assembly	5-22
㉔	T Drawer Assembly	5-23

<Cassette Compartment>



No.	Part Name	Section
㉕	Cassette Compartment Motor	5-24

<Overall Block>



No.	Part Name	Section
㉖	Fan Motor (Plug-in Boards)	5-25-1
㉗	Fan Motor (Power Supply Unit)	5-25-2
㉘	Fan Motor (MD)	5-25-3
㉙	Power Supply Unit	5-26
㉚	Dial Assembly	–

(2) Mounted Circuit Boards

Note

After replacing the mounted circuit boards (or the assembling parts including them), perform the steps after replacement. (Refer to Section 1-25.)

Board	Procedure Section	Steps after replacement Section	Models				
			HDW-				
			2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P
AE-31	5-27-1	1-25-1	○	○	○	○	○
APR-52	1-12 (Plug-in board)	1-25-2	○	○	○	○	○
AU-272	5-27-2 (Plug-in board)	1-25-3	—	—	○	○	○
CCM-15	5-19 (Replaced with Gear Box Assembly)	1-25-4	○	○	○	○	○
CL-29	5-27-3	1-25-5	○	○	○	○	○
CP-350	5-27-4	1-25-6	○	○	○	○	○
CP-351	5-27-5	1-25-7	○	○	○	○	○
CP-371	5-27-6	1-25-8	○	○	○	○	○
CUE-13	5-27-7	1-25-9	○	○	○	○	○
DIF-134	1-12 (EPR-1) Exploded views in Vol. 2	1-25-10	○*1	○*1	○*1	○*1	○*1
DIO-65	5-27-8	1-25-11	○	○	○	○	○
DM-123	1-12 (Plug-in board)	1-25-12	—	—	○	○	○
DPR-155 DPR-229	1-12 (Plug-in board) 1-12 (Plug-in board)	1-25-13 1-25-13	○ ↓ ○	— ○	○ ↓ ○	— ○	○ ↓ ○
DPR-194	Exploded views in Vol. 2	1-25-14	—	—	—	—	—
DPR-195 DPR-208	Exploded views in Vol. 2 Exploded views in Vol. 2	1-25-14 1-25-14	○ — ↓ deleted	— —	○ — ↓ deleted	— —	○ — ↓ deleted
DR-414 DR-508	5-27-9 5-27-9	1-25-15 1-25-15	○ ↓ ○	— ○	○ ↓ ○	— ○	○ ↓ ○
DSP-109	Exploded views in Vol. 2	1-25-16	—	—	—	—	—
DT-47	5-27-10	1-25-17	○	○	○	○	○
DU-107	5-3	1-25-18	—	—	○	○	○
EPR-1	1-12 (Plug-in board)	1-25-19	—	—	—	—	—
EQ-84	5-27-11	1-25-20	○	○	○	○	○
FP-133	5-27-12	1-25-21	○	○	○	○	○
FP-134	5-27-12	1-25-22	○	—	○	—	○
HIF-1	1-12 (Plug-in board)	1-25-23	○	○	○	○	○
HN-268	Exploded views in Vol. 2	1-25-24	○	○	○	○	○
HP-101	5-27-13	1-25-25	○	○	○	○	○
HPR-1	1-12 (Plug-in board)	1-25-26	○	○	○	○	○
IF-885	Exploded views in Vol. 2	1-25-27	—	—	—	—	—
IF-886	Exploded views in Vol. 2	1-25-28	—	—	—	—	—

*1: Option HKDW-102 *2: Option BKMW-104 *3: Option BKMW-E2000/E3000 *4: Option BKMW-E3000 ↓: Changed

								Board
DVW-		MSW-						
2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P	M2000E M2000EP	M2100 M2100P	M2100E M2100EP	
○	○	—	○	○	○	○	○	AE-31
○	○	○	○	○	○	○	○	APR-52
—	○	—	○	○	○	○	○	AU-272
○	○	○	○	○	○	○	○	CCM-15
○	○	○	○	○	○	○	○	CL-29
○	○	○	○	○	○	○	○	CP-350
○	○	○	○	○	○	○	○	CP-351
○	○	○	○	○	○	○	○	CP-371
○	○	—	—	○	○	○	○	CUE-13
—	—	—	—	—	—	—	—	DIF-134
○	○	○	○	○	○	○	○	DIO-65
—	○	—	○	○	○	○	○	DM-123
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	— ○	○ ↓ ○	— ○	DPR-155 DPR-229
—	—	○ ↓ deleted	—	—	—	—	—	DPR-194
— —	— —	— —	— ○ ↓ deleted	— ○ ↓ deleted	— —	— ○ ↓ deleted	— —	DPR-195 DPR-208
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	— ○	○ ↓ ○	— ○	DR-414 DR-508
—	—	○*4	○*4	○*4	○	○*4	○	DSP-109
○	○	○	○	○	○	○	○	DT-47
—	○	—	—	○	○	○	○	DU-107
○	○	○	○	○	○	○	○	EPR-1
○	○	○	○	○	○	○	○	EQ-84
○	○	○	○	○	○	○	○	FP-133
—	—	—	○	○	—	○	—	FP-134
○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2	HIF-1
○	○	○	○	○	○	○	○	HN-268
○	○	○	○	○	○	○	○	HP-101
—	—	—	—	—	—	—	—	HPR-1
—	—	○*3	○*3	○*3	○	○*3	○	IF-885
—	—	○*3	○*3	○*3	○	○*3	○	IF-886

(Continued)

Board	Procedure Section	Steps after replacement Section	Models				
			HDW-				
			2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P
KY-464	Exploded views in Vol. 2	1-25-29	○	—	○	—	○
			↓		↓		↓
KY-569	Exploded views in Vol. 2	1-25-29	○	○	○	○	○
KY-465	Exploded views in Vol. 2	1-25-29	○	—	○	—	○
			↓		↓		↓
KY-570	Exploded views in Vol. 2	1-25-29	○	○	○	○	○
LED-357	5-27-14	1-25-30	○	○	○	○	○
LP-81	1-5 (Cassette compartment) Exploded views in Vol. 2	1-25-31	○	○	○	○	○
MB-884	5-27-16	1-25-32	○	○	○	○	○
PC-70	1-5 (Replaced with Cassette compartment)	1-25-33	○	○	○	○	○
PTC-101	Exploded views in Vol. 2 (Replaced with Search dial assembly)	1-25-34	○	○	○	○	○
PTC-102	5-19 (Replaced with Gear box assembly)	1-25-35	○	○	○	○	○
PTC-99	Exploded views in Vol. 2 (Replaced with MC sensor assembly)	1-25-36	○	○	○	○	○
RC-89	1-12 (APR-52) Exploded views in Vol. 2	1-25-37	○	○	○	○	○
RX-80	1-12 (HIF-1) Exploded views in Vol. 2	1-25-38	○	○	○	○	—
SDI-52	1-12 (VPR-64) Exploded views in Vol. 2	1-25-39	○	○	○	○	○
SDI-63	1-12 (HIF-1) Exploded views in Vol. 2	1-25-40	○ ↓ RX-80 & TX-96	—	○ ↓ RX-80 & TX-96	—	○ ↓ TX-96
SE-606/606A	5-14	1-25-41	○	○	○	○	○
SS-89	1-12 (Plug-in board)	1-25-42	○	○	○	○	○
SW-1106	Exploded views in Vol. 2	1-25-43	—	—	—	—	—
SWC-40	5-27-15	1-25-43	○	○	○	○	○
TC-104	5-27-17	1-25-44	○	○	○	○	○
TR-119	5-21 (Replaced with S tension regulator)	1-25-45	○	○	○	○	○
TR-120	5-22 (Replaced with T tension regulator)	1-25-46	○	○	○	○	○
TX-96	1-12 (HIF-1) Exploded views in Vol. 2	1-25-47	○	○	○	○	○
VN-13	Exploded views in Vol. 2	1-25-48	—	—	—	—	—
VPR-64	1-12 (Plug-in board)	1-25-49	○	○	○	○	○
VPR-91	1-12 (Plug-in board)	1-25-49	—	—	—	—	—
VR-262	Exploded views in Vol. 2	1-25-50	○	—	○	—	○
			↓		↓		↓
VR-300	Exploded views in Vol. 2	1-25-50	○	○	○	○	○

*2: Option BKMW-104 *3: Option BKMW-E2000/E3000 ↓: Changed

								Board
DVW-		MSW-						
2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P	M2000E M2000EP	M2100 M2100P	M2100E M2100EP	
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	KY-464 KY-569
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	KY-465 KY-570
○	○	○	○	○	○	○	○	LED-357
○	○	○	○	○	○	○	○	LP-81
○	○	○	○	○	○	○	○	MB-884
○	○	○	○	○	○	○	○	PC-70
○	○	○	○	○	○	○	○	PTC-101
○	○	○	○	○	○	○	○	PTC-102
○	○	○	○	○	○	○	○	PTC-99
—	—	—	—	—	—	—	—	RC-89
—	—	—	—	—	—	—	—	RX-80
○	○	○	○	○	○	○	○	SDI-52
—	—	—	—	—	—	—	—	SDI-63
○	○	○	○	○	○	○	○	SE-606/606A
○	○	○	○	○	○	○	○	SS-89
— ○	— ○	○*3 or ○	○*3 or ○	○*3 or ○	○ —	○*3 or ○	○ —	SW-1106 SWC-40
○	○	○	○	○	○	○	○	TC-104
○	○	○	○	○	○	○	○	TR-119
○	○	○	○	○	○	○	○	TR-120
○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2	TX-96
—	—	○*3	○*3	○*3	○	○*3	○	VN-13
—	—	○	○	○	○	○	○	VPR-64
○	○	—	—	—	—	—	—	VPR-91
— ○	— ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	○ ↓ ○	VR-262 VR-300

5-1-2. Threading End Mode and Unthreading End Mode

1. Threading End Mode

Threading end mode means that the threading ring rotates counterclockwise, then stops.

There are two ways of putting the unit into the threading end mode with the cassette compartment taken off the unit.

Method 1 (When power on) :

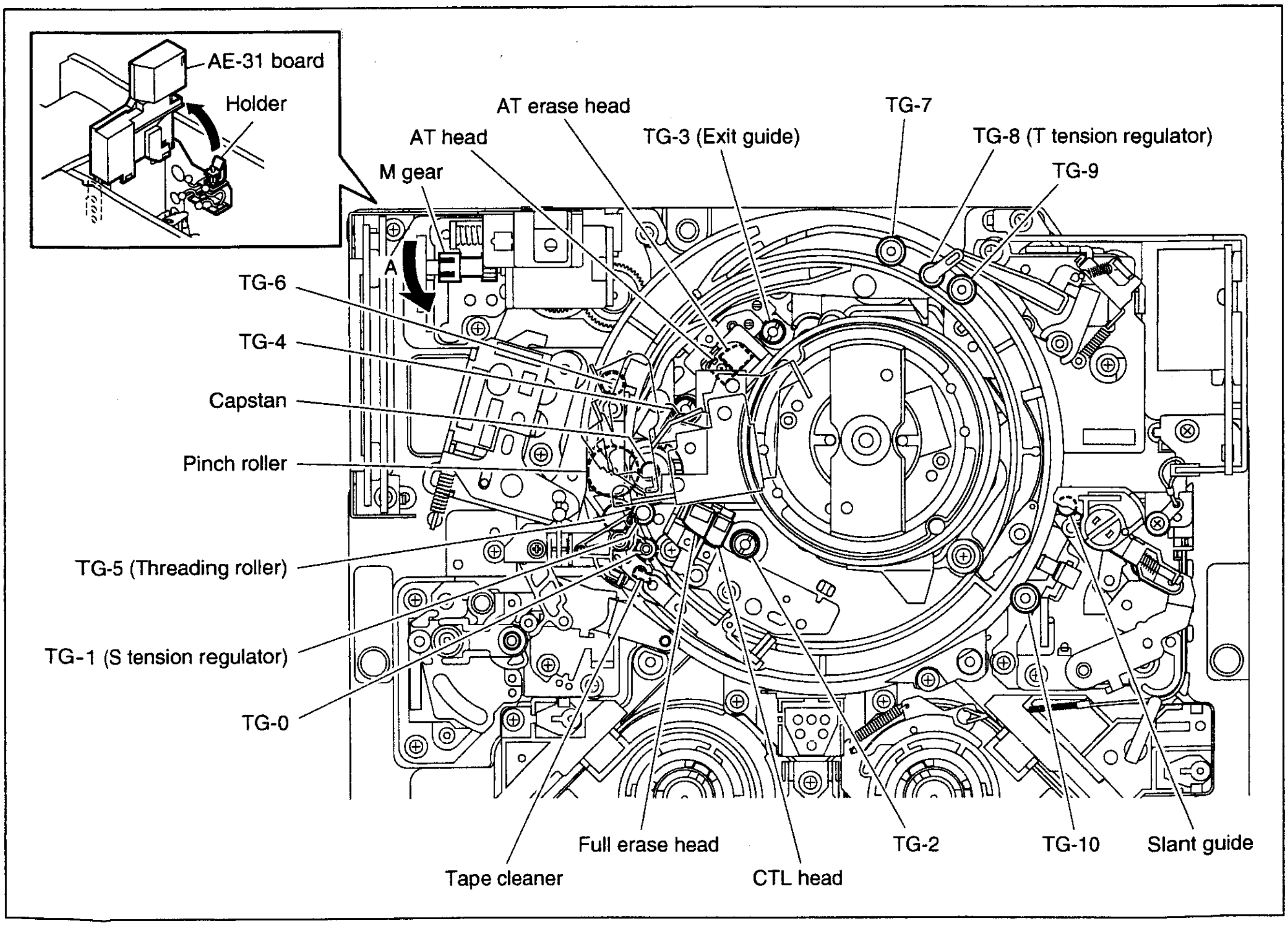
(1) Enter the maintenance mode.
(2) Using C012 : THREADING, put the unit into the threading end state.
(Refer to Section 3-2-2.)

Note

The unit will return to the unthreading end state when exiting C012 : THREADING.

Method 2 (When power off) :

(1) Release the lock of the board holder and open the AE-31 board in the arrow direction. (The AE-31 board is not mounted in MSW-2000.)
(2) Turn the M gear of the gear box assembly in the direction of the arrow A.


AE-31 board
Holder
AT erase head
AT head
M gear
A
TG-3 (Exit guide)
TG-7
TG-8 (T tension regulator)
TG-9
TG-6
TG-4
Capstan
Pinch roller
TG-5 (Threading roller)
TG-1 (S tension regulator)
TG-0
Full erase head
Tape cleaner
CTL head
TG-2
TG-10
Slant guide

Threading End Mode

2. Unthreading End Mode

Unthreading end mode means that the threading ring rotates clockwise, then stops.
(It is same state as EJECT completion mode.)

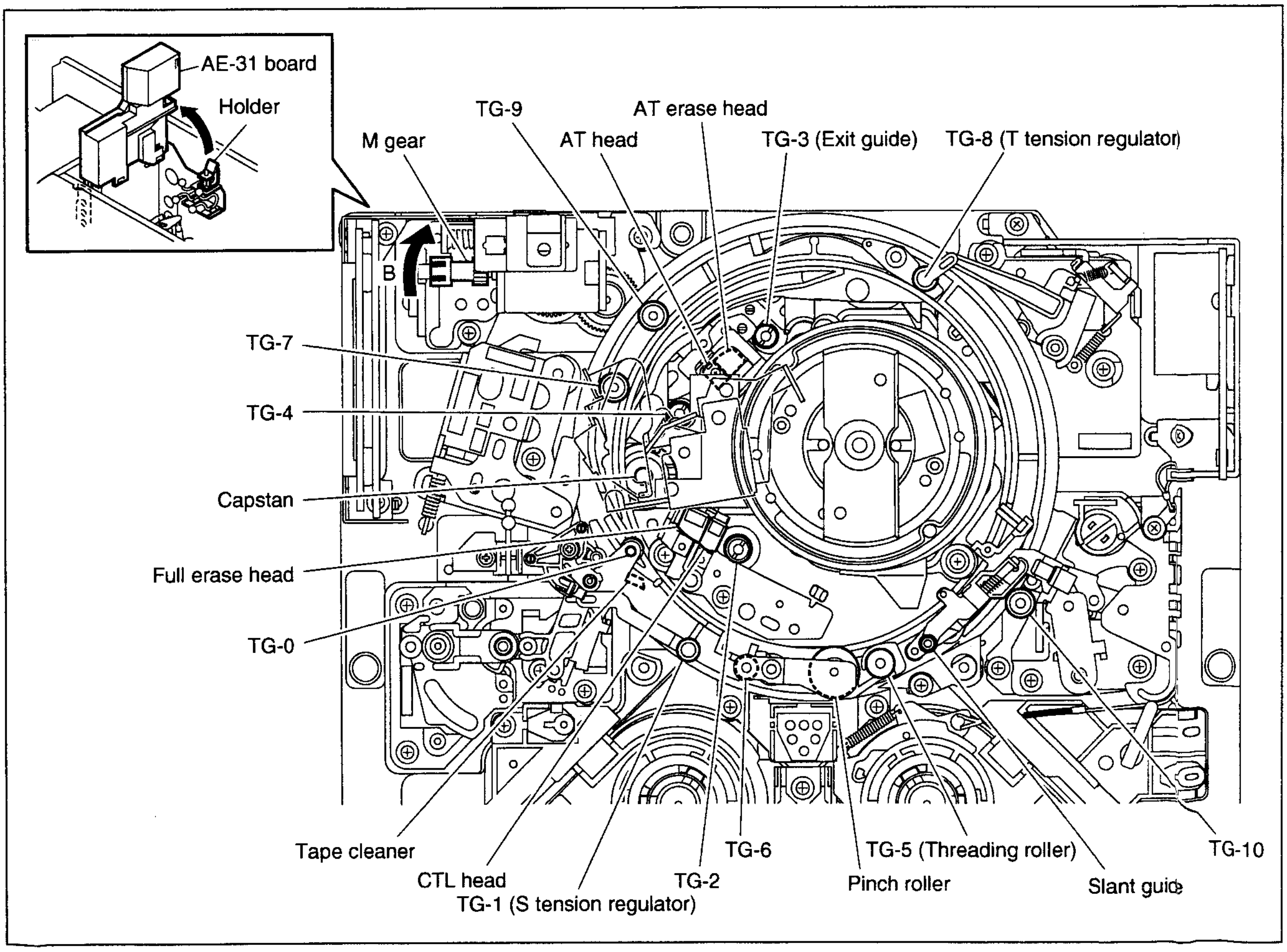
There are two methods of putting the unit into the unthreading end mode with the cassette compartment taken off the unit.

Method 1 (When power on) :

(1) Enter the maintenance mode.
(2) Using C012 : THREADING, put the unit into the unthreading end state. (Refer to Section 3-2-2.)

Method 2 (When power off) :

(1) Release the lock of the board holder and open the AE-31 board in the arrow direction. (The AE-31 board is not mounted in MSW-2000.)
(2) Turn the M gear of the gear box assembly in the direction of the arrow B.


AE-31 board
Holder
M gear
B
TG-9
AT head
AT erase head
TG-3 (Exit guide)
TG-8 (T tension regulator)
TG-7
TG-4
Capstan
Full erase head
TG-0
Tape cleaner
CTL head
TG-1 (S tension regulator)
TG-2
TG-6
TG-5 (Threading roller)
Pinch roller
Slant guide
TG-10

Unthreading End Mode

5-1-3. L Cassette Position and S Cassette Position

1. L Cassette Position

L cassette position means that the reel tables are in the position of L cassette tape.

There are three methods of putting the reel tables into the L cassette position from the S cassette position with the cassette compartment taken off the unit.

Method 1 (When power on) :

Press the switch S300 on the SS-89 board.
(Press once again to return to the L cassette position.)

Method 2 (When power on) :

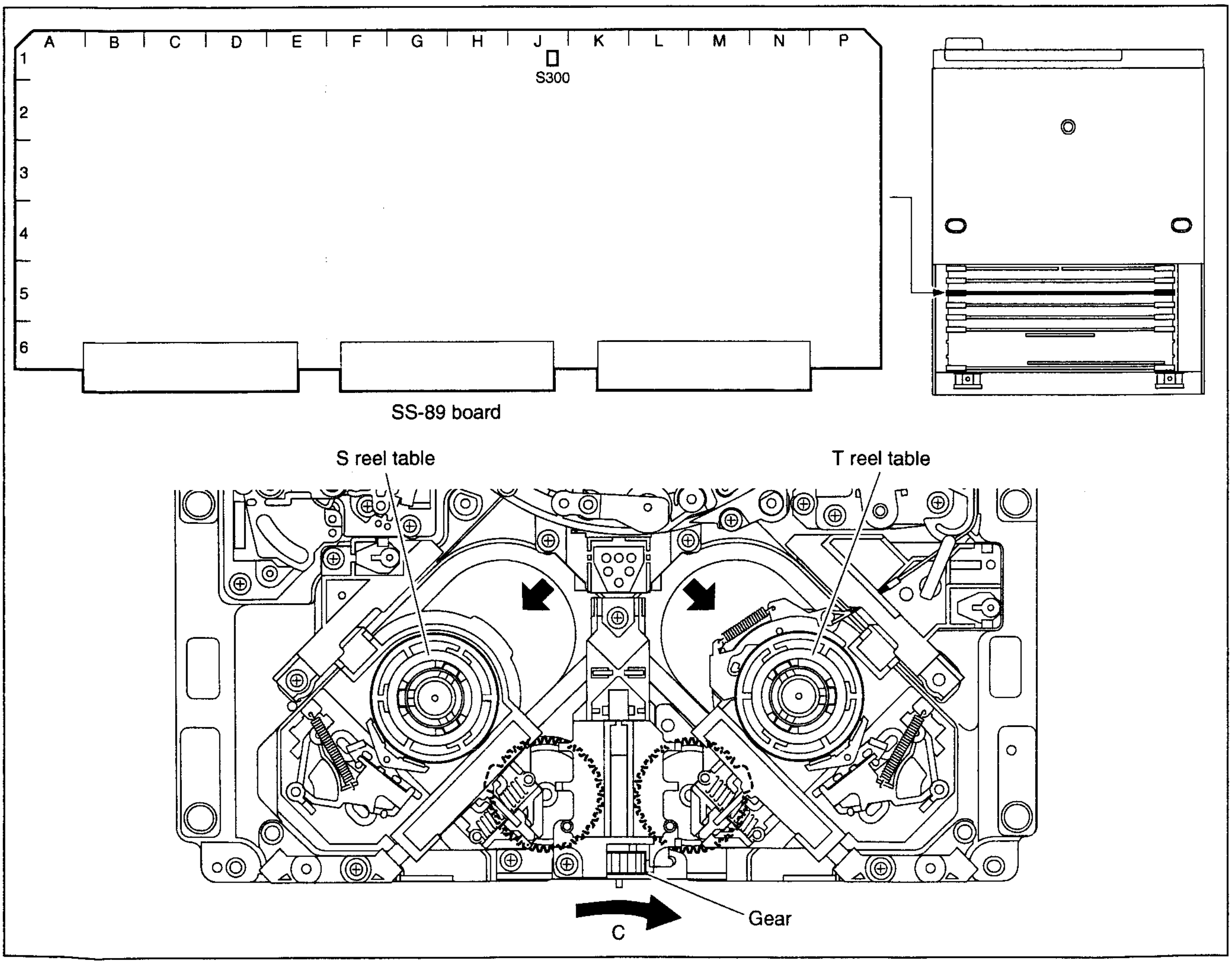
(1) Enter the maintenance mode.
(2) Using C016 : REEL POSITION, put the reel tables into the L cassette position. (Refer to Section 3-2-2.)

Method 3 (When power off) :

Turn the gear of the motor holder assembly in the direction of the arrow C until it stops lightly by fingers.

Note

Be careful not to turn the gear excessively. Or the gear locks and the reel shift operation can not be made.



L Cassette Position

2. S Cassette Position

S cassette position means that the reel tables are in the position of S cassette tape.

There are three methods of putting the reel tables into the S cassette position from the L cassette position with the cassette compartment taken off the unit.

Method 1 (When power on) :
Press the switch S300 on the SS-89 board.
(Press once again to return to the S cassette position.)

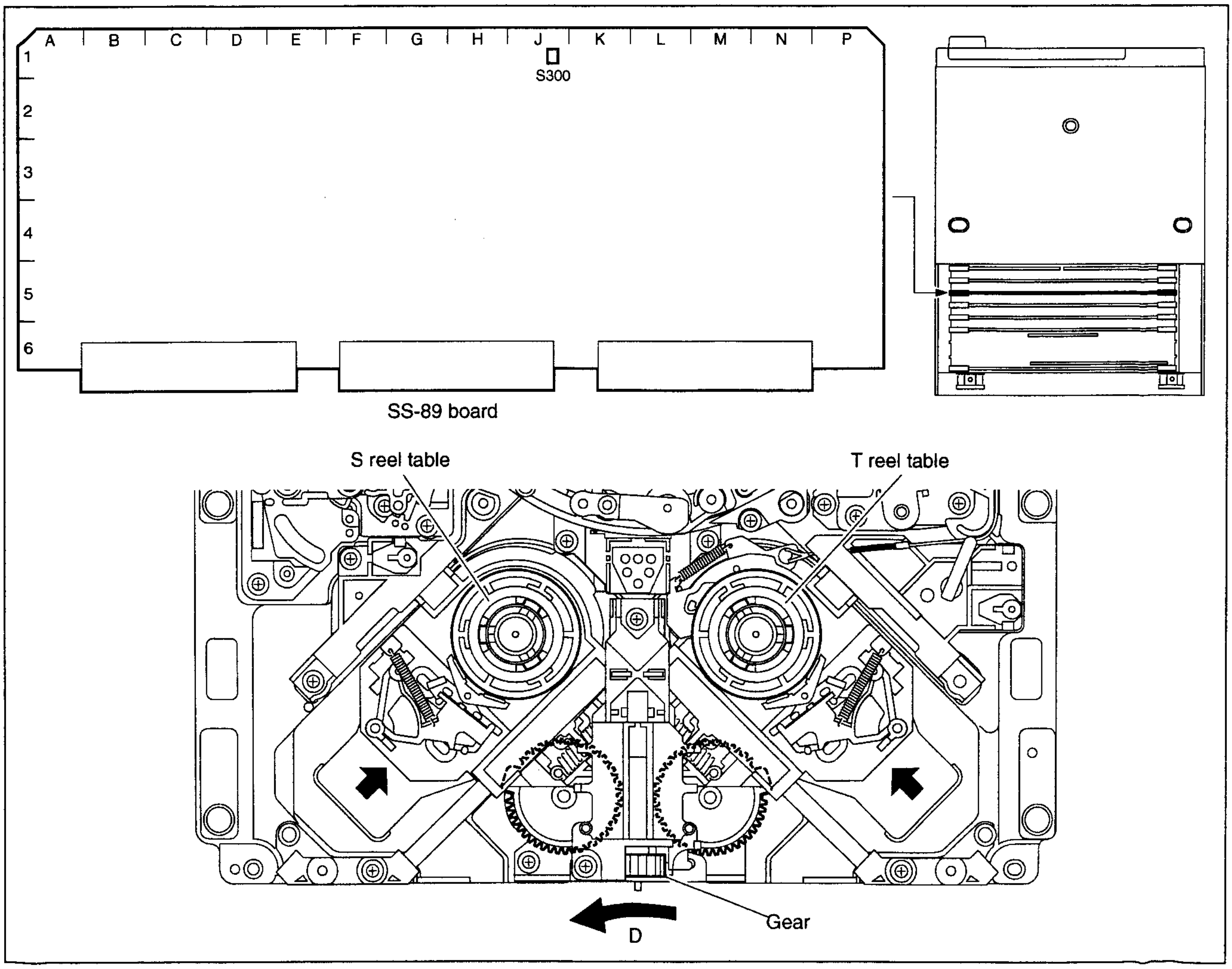
Method 2 (When power on) :

(1) Enter the maintenance mode.
(2) Using C016 : REEL POSITION, put the reel tables into the S cassette position. (Refer to Section 3-2-2.)

Method 3 (When power off) :
Turn the gear of the motor holder assembly in the direction of the arrow D until it stops lightly by fingers.

Note

Be careful not to turn the gear excessively. Or the gear locks and the reel shift operation can not be made.



S Cassette Position

5-1-4. Basic Knowledge

1. Tape Cleaner

CAUTION

Never touch the edge of the tape cleaner with bare hands.
It is in danger of cutting your finger because the tape cleaner has a sharp edge.
Pay careful attention when replacing or adjusting the peripheral parts.

2. Tools

Before use a tool, clean the surface of the tool using a cleaning cloth moistened with cleaning fluid.

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Be careful not to damage the tool. If the flawed tool is used, adjustment cannot be performed correctly.

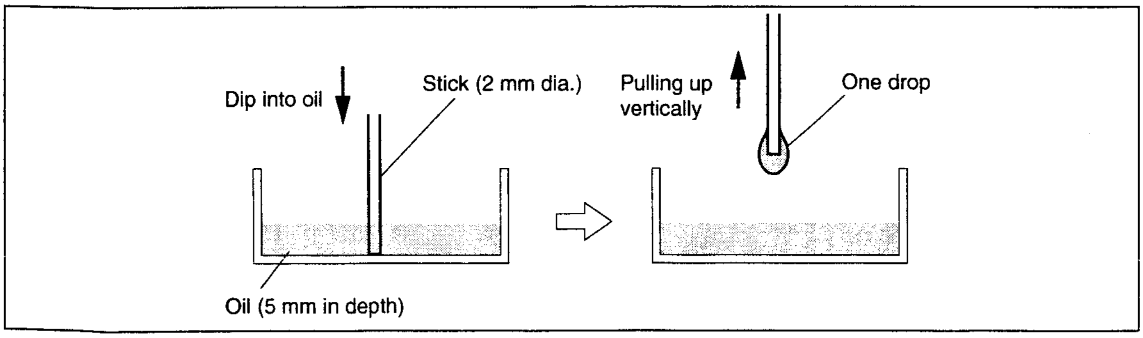
3. Grease and Oil

Do not use the grease and oil except for specified portions.
Please use only the specified grease and oil.
If the different grease or oil is used, major malfunctions may be caused due to differences in viscosity and ingredients.
And if the grease or oil that has been mixed with dust is used, major malfunctions may be caused.
Use the following grease and oil.

- Grease (SGL-505): 7-661-000-10
- Oil: 7-661-018-18

Apply just enough grease to create a thin film on the surface of the part.
Any grease that adheres to other surrounding parts must be wipe using a gauze or soft cloth.

One drop of oil is defined as follows:
About the amount that will adhere to the end of a stick 2 mm in diameter, as shown in the figure.



Oil

4. Stop Washer and E Ring

It should not be used the stop washer and E ring once again.
It is recommended checking a required stop washer and E ring before replacement, and preparing more than required number.

5-2. Upper Drum Assembly Replacement

CAUTION

Never touch the rotating drum.
If you touch the drum with hand or screwdriver, you may get hurt by the rapidly spring drum.

- Make sure that the rotating drum completely stops before cleaning or replacing parts.
- Never touch the rotating drum during adjusting.

Outline

Replacement

1. Removing the W Cleaner Assembly (Refer to steps 1 and 2 in Section 5-5.)
2. Removing the Brush Slip Ring Assembly
3. Removing the Upper Drum Assembly
4. Cleaning (Upper drum assembly mounting surface, Lower drum flange surface, Tape running surface, Lead surface and Contacting points)
5. Attaching the Upper Drum Assembly
6. Cleaning
   (DR-341 board contacting points, Brush slip ring assembly mounting surface)
7. Reattaching the Brush Slip Ring Assembly
8. Cleaning (Video heads, Upper drum tape running surface)
9. Reattaching the W Cleaner Assembly (Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

10. Adjusting the Tape Running
    MSW Recorder ⇨ Refer to Section 6-2.
    MSW Player ⇨ Refer to Section 6-3.
    HDW Recorder ⇨ Refer to Section 6-4.
    HDW Player ⇨ Refer to Section 6-5.
    DVW Recorder ⇨ Refer to Section 6-6.
11. Confirming the Tape Running (Refer to Section 6-7.)
12. Electrical Adjustment after Replacing the Drum (Refer to Section 7-2.)

Note

When the video head tip is worn or damaged, replace the upper drum assembly. It cannot be replaced only head tip.

Basic Knowledge

Except in the periodic replacement time, replace the upper drum assembly in the following case.

- A correct RF signal waveform cannot be obtained even if the tracking adjustment is performed.

Tools

• Hexagonal wrench driver (2.5 mm):	7-700-766-04
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A
• Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 120 mm):	J-6251-090-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Upper drum remover (Supplied with a new repair upper drum)	

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Removing the W Cleaner Assembly

Remove the W cleaner assembly.
(Refer to steps 1 and 2 in Section 5-5.)

2. Removing the Brush Slip Ring Assembly

(1) Disconnect the flexible board from the connector CN220 on the DT-47 board.

(2) Fully loosen the two screws, then remove the brush slip ring assembly.

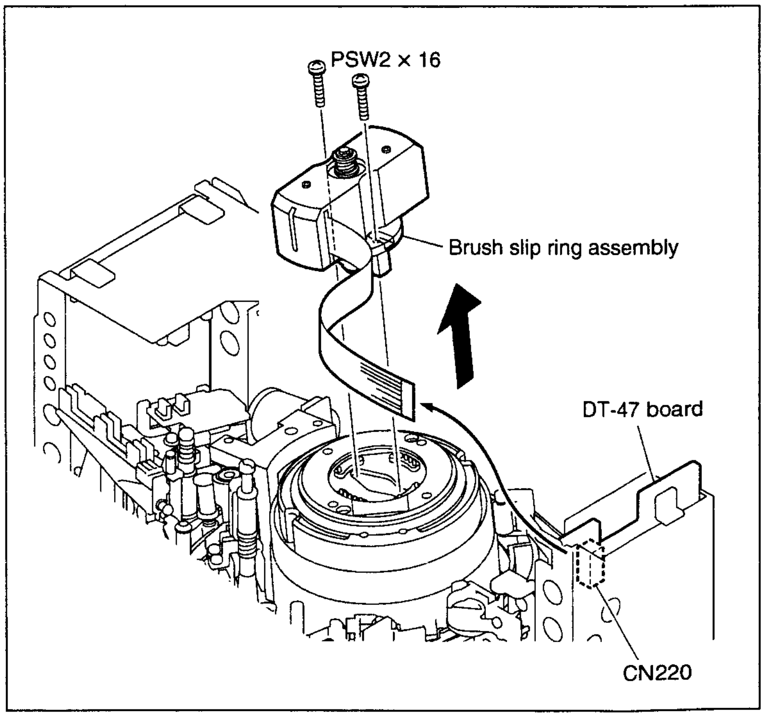
Note

Do not apply excessive force to the brush slip ring assembly at that time.

(3) Turn the brush slip ring assembly upside down, and take out the two screws.

Note

Use care not to fall the screws into the cover of the brush slip ring assembly.



Remove the Brush Slip Ring Assembly

3. Removing the Upper Drum Assembly

(1) Insert the hexagonal wrench driver from the screw hole (A) and fully loosen the screw.

Note

The upper drum assembly is fixed with the four fixing screws (C3 × 12) in the screw holes (A). These screws cannot be removed because of stoppers.

(2) Make sure that the projection of the hexagon screw from the upper drum remover's surface is within 5 millimeters.

Note

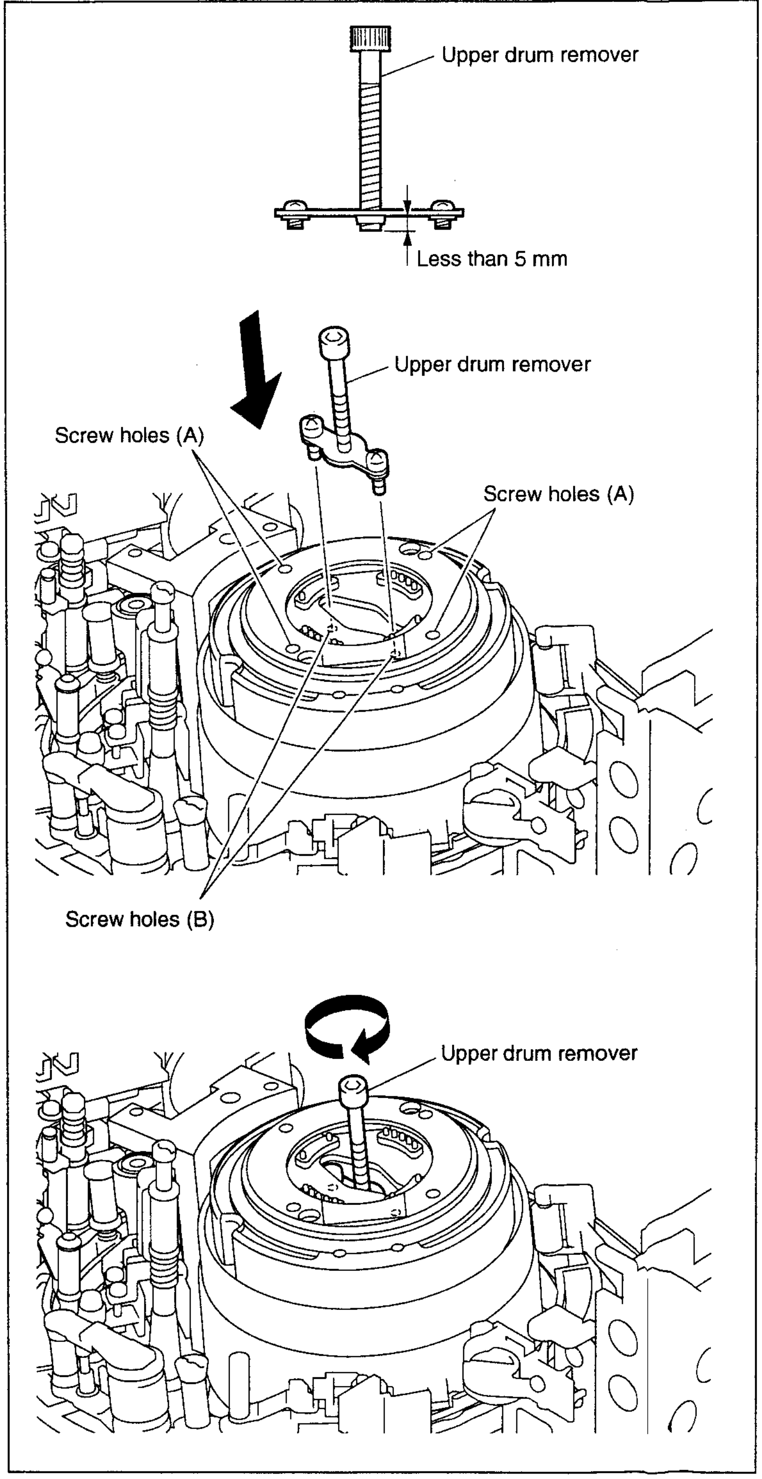
The upper drum remover is supplied with an upper drum for repair.

(3) Attach the upper drum remover to the two screw holes (B) of the brush slip ring assembly with two screws.

(4) Turn the hexagon screw of the upper drum remover clockwise by finger. The upper drum will be slowly detached from the shaft of the lower drum.

Note

If the hexagon screw of the upper drum remover is being rotated with the four upper drum fixing screws loosened insufficiently, the lower drum may get damaged.


Upper drum remover
Less than 5 mm
Upper drum remover
Screw holes (A)
Screw holes (A)
Screw holes (B)
Upper drum remover

Remove the Upper Drum Assembly

Installation

Note

The upper drum assembly for repair is provided with the upper drum cover. The cover is used for positioning when installing the upper drum. Never remove it until removal is instructed.

4. Cleaning

(1) Clean the portions below with a cleaning cloth moistened with cleaning fluid.

- New upper drum assembly mounting surfaces (shaded portions shown in the figure)
- Lower drum flanges (shaded portions shown in the figure) and edge portion
- Lower drum's tape running surface and lead portion (Refer to Section 4-2-4.)

Note

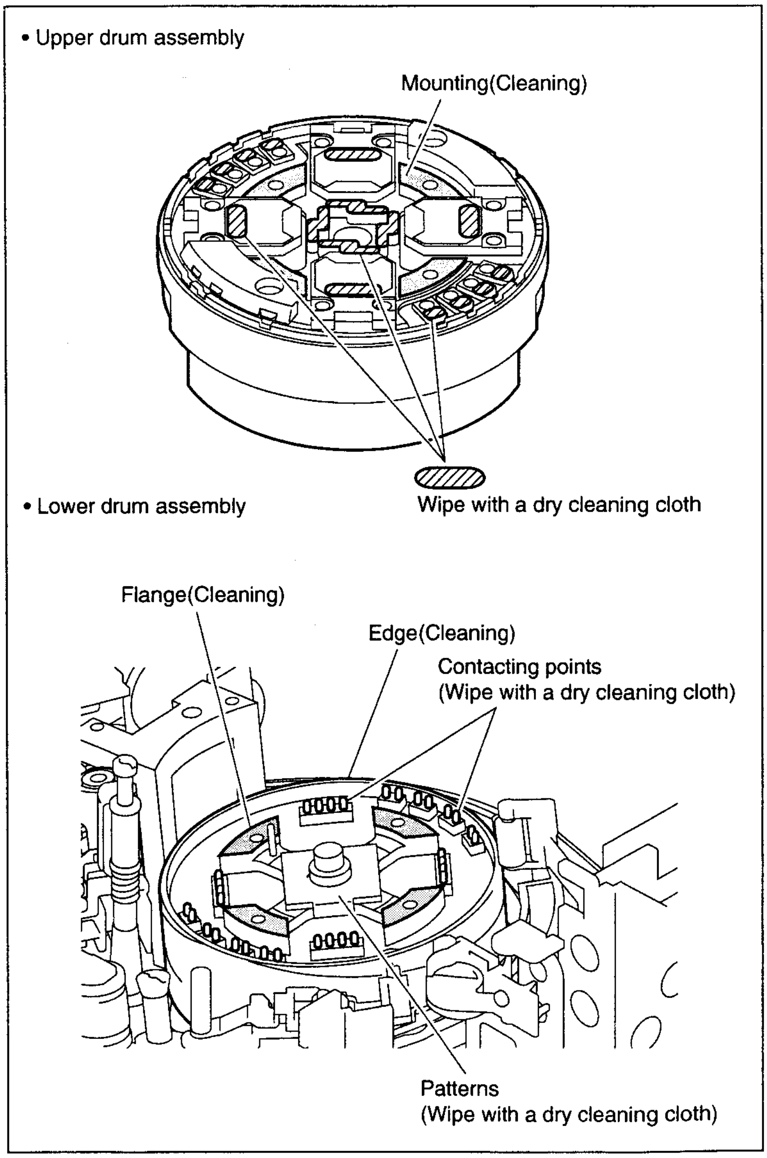
After cleaning, wipe with a dry cleaning cloth.

(2) Wipe the portions shown in the figure with a dry cleaning cloth.

Note

Do avoid applying the cleaning fluid to the contacting points and patterns.

- Contacting points of upper drum
- Patterns of upper drum
- Contacting points of lower drum
- Patterns of lower drum


• Upper drum assembly
Mounting(Cleaning)
▨ Wipe with a dry cleaning cloth
• Lower drum assembly
Flange(Cleaning)
Edge(Cleaning)
Contacting points (Wipe with a dry cleaning cloth)
Patterns (Wipe with a dry cleaning cloth)

Cleaning

5. Attaching the Upper Drum Assembly

Note

When installing the upper drum assembly, be careful to the orientation of the upper drum assembly, if not the demagnetization head may be damaged.

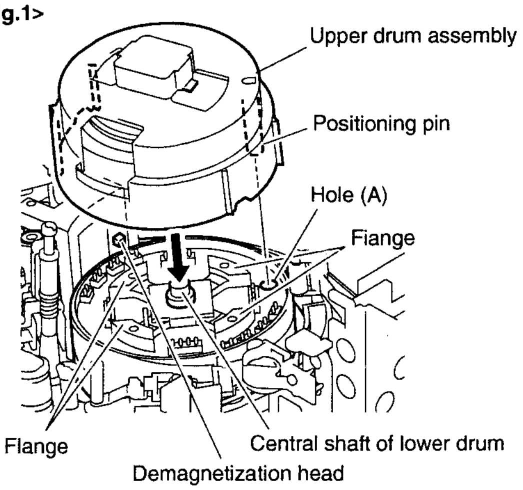
(1) Align the hole (A) with the positioning pin on the upper drum cover. (Fig. 1)

(2) Gently put the upper drum assembly onto the lower drum with the central shaft of lower drum and the central hole of upper drum aligned, while keeping the state of step (1).

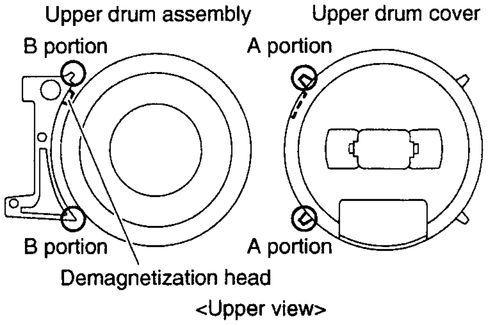
Notes

- When installing the upper drum assembly, install it so that the guides of A portion move along the B portions. (Fig.2)
- Never hold the claws of the upper drum cover at this time.
- Be careful not to touch the AT head, peripheral tape guides and drum support when installing the upper drum assembly.
- Do not turn the upper drum with the upper drum cover is attached to.

<Fig.1>


Upper drum assembly
Positioning pin
Hole (A)
Flange
Flange
Central shaft of lower drum
Demagnetization head

<Fig.2>


Upper drum assembly
Upper drum cover
B portion
A portion
B portion
A portion
Demagnetization head
<Upper view>

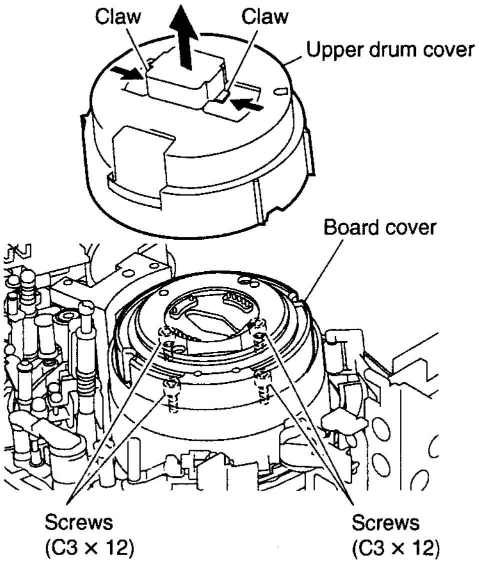
Attach the Upper Drum Assembly

(3) Press the claws of the upper drum cover in the direction indicated by the arrows and remove the cover.

(4) Push the central portion of the upper drum down by finger, and press the upper drum against the flange of the lower drum surely.

(5) Temporarily tighten the four screws in the order shown on the board cover while keeping the state of step (4).
Tightening torque: 39.2×10^{-2} N•m
{4.0 kgf•cm}

(6) Securely tighten the four screws in the same order in step (5).
Tightening torque: 58.8×10^{-2} N•m
{6.0 kgf•cm}


Claw
Claw
Upper drum cover
Board cover
Screws
(C3 x 12)
Screws
(C3 x 12)

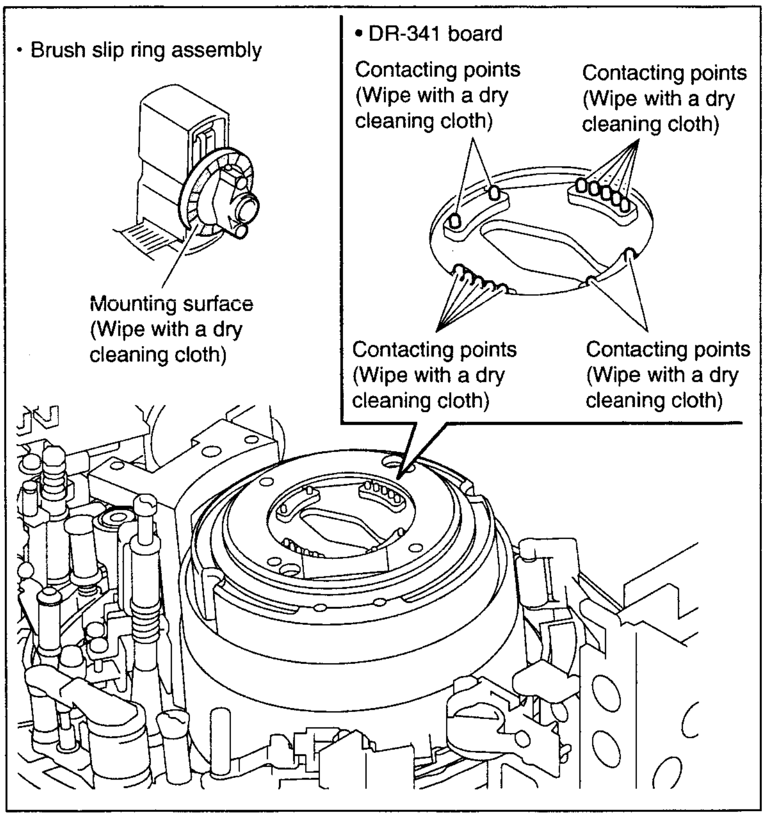
Remove the Upper Drum Cover

6. Cleaning

Wipe the brush slip ring assembly mounting surface (shaded portion in the figure) and the DR-341 board contacting points with a dry cleaning cloth.

Note

Do not apply the cleaning fluid to the contacting points.


• Brush slip ring assembly
Mounting surface (Wipe with a dry cleaning cloth)
• DR-341 board
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)

Cleaning

7. Reattaching the Brush Slip Ring Assembly

(1) Insert the two screws taken out in (3) of step 2 into the screw holes of the brush slip ring assembly.

(2) Insert the brush slip ring assembly into the upper drum assembly as shown in the figure.

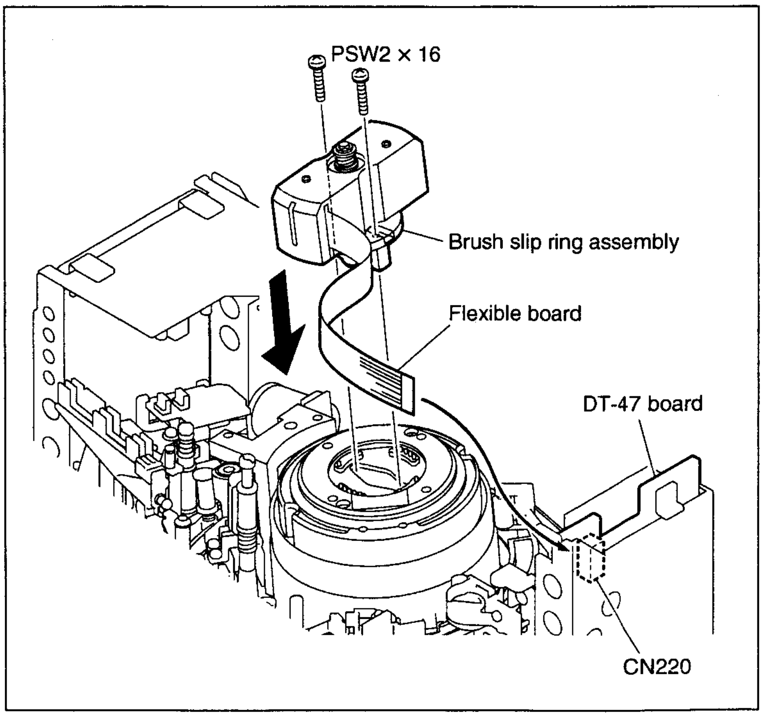
(3) Tighten the two screws alternately while pushing both sides of the flange equally from above.

Tightening torque: 14.7×10^{-2} N•m
{1.5 kgf•cm}

Note

Never apply excessive force to the cover.

(4) Connect the flexible board into the connector CN220 on the DT-47 board, then lock.


PSW2 x 16
Brush slip ring assembly
Flexible board
DT-47 board
CN220

Reattach the Brush Slip Ring Assembly

8. Cleaning

Clean the upper drum tape running surface and the video heads. (Refer to Section 4-2-3.)

Note

After cleaning, wipe with a dry cleaning cloth.

9. Reattaching the W Cleaner Assembly

Reattach the W cleaner assembly.
(Refer to steps 4 to 6 in Section 5-5.)

Adjustment after Replacement

10. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

11. Confirming the Tape Running

Refer to Section 6-7.

12. Electrical Adjustment after Replacing the Drum

Refer to Section 7-2.

5-3. Drum Assembly Replacement

Outline

Replacement

1. Removing the W Cleaner Assembly (Refer to steps 1 and 2 in Section 5-5.)
2. Removing the Drum Assembly
3. Cleaning
   (Drum assembly mounting surfaces and Chassis mounting surfaces)
4. Attaching the Drum Assembly
5. Cleaning (Video heads, Upper drum's tape running surface and Lower drum's tape running surface)
6. Reattaching the W Cleaner Assembly (Refer to steps 4 though 6 in Section 5-5.)

Adjustment after Replacement

7. Confirming the Drum Motor Operation
   (C015 : DRUM MOTOR) (Refer to Section 3-2-2.)
8. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
9. Confirming the Tape Running (Refer to Section 6-7.)
10. Electrical Adjustment after Replacing the Drum (Refer to Section 7-2.)

Note

Be careful not to damage the AT head and peripheral tape guides when removing or installing the drum assembly.

Basic knowledge

Except in the periodic replacement time, replace the drum assembly in the following cases.

- The lower drum's tape running surface is damaged and cannot be repaired.
- A correct RF signal waveform cannot be obtained due to the worn lower drum even if the tracking adjustment is performed.
- The performance of the unit deteriorates because of the noise or jitter caused by the bearing life.

Tools

• Hexagonal wrench driver (2.5 mm):	7-700-766-04
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 120 mm):	J-6251-090-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front and rear) assemblies. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Removing the W Cleaner Assembly

Remove the W cleaner assembly.
(Refer to steps 1 and 2 in Section 5-5.)

2. Removing the Drum Assembly

(1) Turn the upper drum assembly manually counterclockwise and align the ⇨ mark of the board cover with the fixing screw position on the lower drum assembly.

Note

The drum assembly is fixed to the MD base assembly with the three fixing screws (C3 × 8) in the screw hole.

(2) Fully loosen the screw using a hexagonal wrench driver.

Note

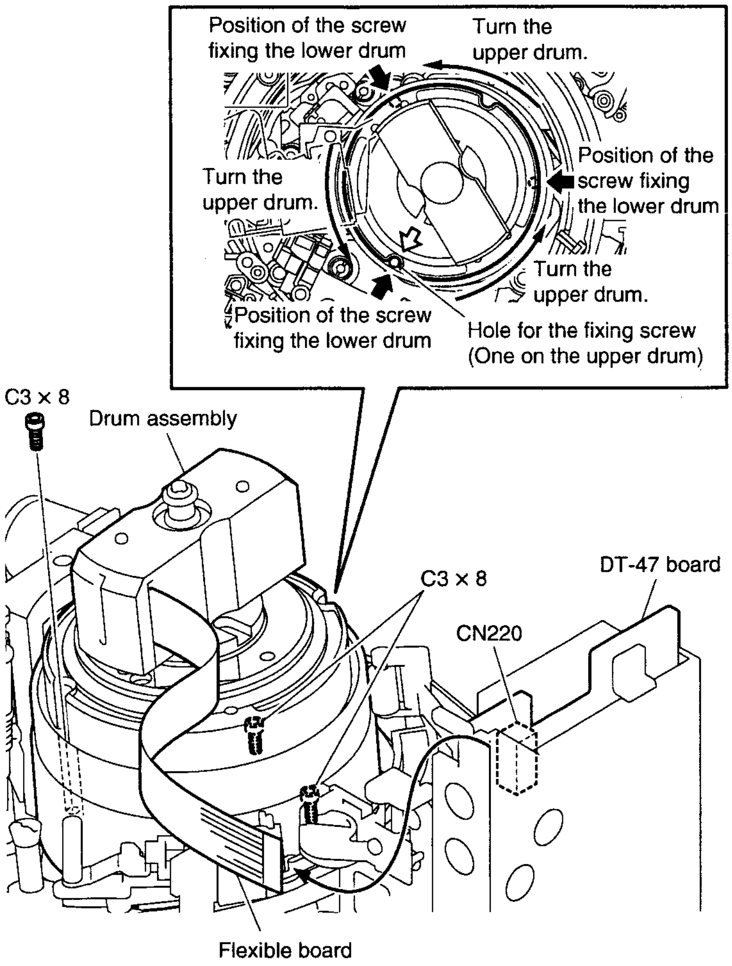
These screws cannot be removed because of stoppers.

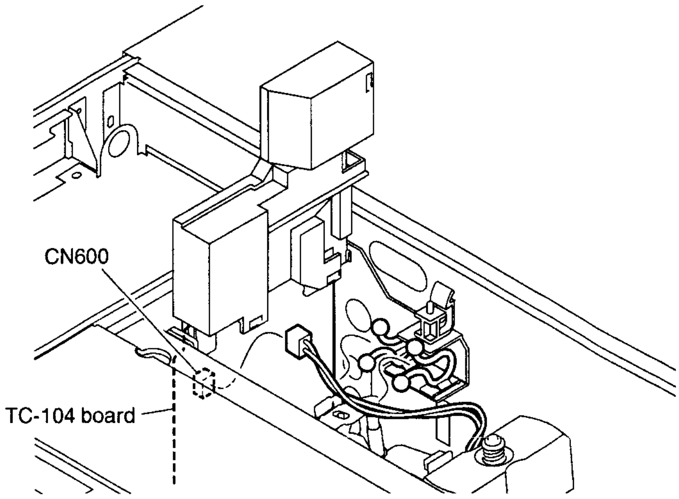
(3) Fully loosen other two screws in the same way in steps (1) and (2).

(4) Disconnect the flexible board from the connector CN220 on the DT-47 board.

(5) **For HDW-M, HDW-S, DVW-M and MSW-M series only**

Disconnect the harness from the connector CN600 on the TC-104 board.


Position of the screw fixing the lower drum
Turn the upper drum.
Turn the upper drum.
Position of the screw fixing the lower drum
Turn the upper drum.
Position of the screw fixing the lower drum
Hole for the fixing screw (One on the upper drum)
C3 x 8
Drum assembly
C3 x 8
DT-47 board
CN220
Flexible board


CN600
TC-104 board

<For HDW-M, HDW-S, DVW-M and MSW-M series only>

(6) Remove the EQ-84 board together with the AU-272 board (or dummy board), and remove the drum harnesses from the harness clamp of the EQ-84 board.

(7) Retract the drum harnesses to the mechanical deck side (in the arrow direction).

(8) Raise the drum assembly uprightly.

Notes

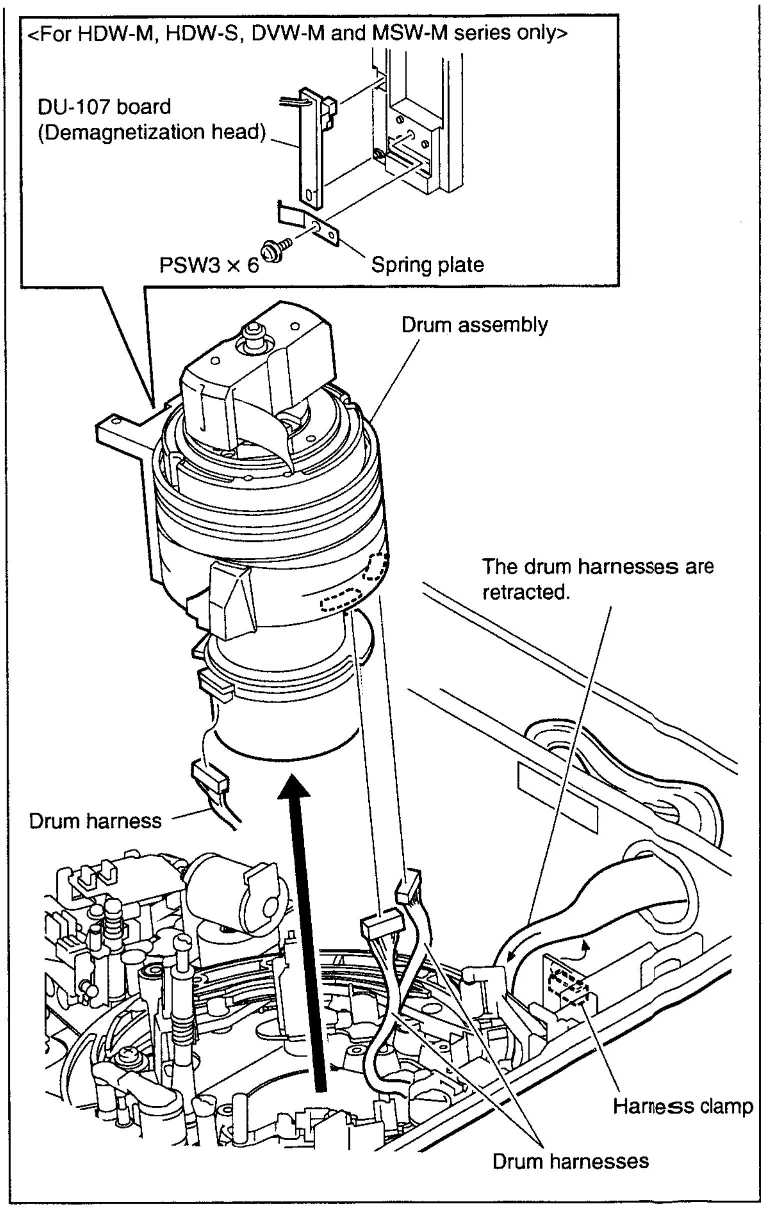
- Be careful not to raise the drum assembly by holding the brush slip ring assembly.
- When lifting up the drum assembly, the drum harnesses connected to the drum assembly are retracted in the underside of the MD base assembly, therefore use care to prevent the drum harnesses from contacting to other parts in vicinity.

(9) Disconnect the three drum harnesses from the three connectors of the drum assembly while keeping state of step (8).
According the drum assembly can be removed.

Note

Be careful not to touch the AT head and peripheral tape guides when removing the drum assembly.

(10)**For HDW-M, HDW-S, DVW-M and MSW-M series only**
Remove the screw and remove the spring plate and the DU-107 board (demagnetization head).


<For HDW-M, HDW-S, DVW-M and MSW-M series only>
DU-107 board
(Demagnetization head)
PSW3 x 6
Spring plate
Drum assembly
The drum harnesses are retracted.
Drum harness
Harness clamp
Drum harnesses

Remove the Drum Assembly

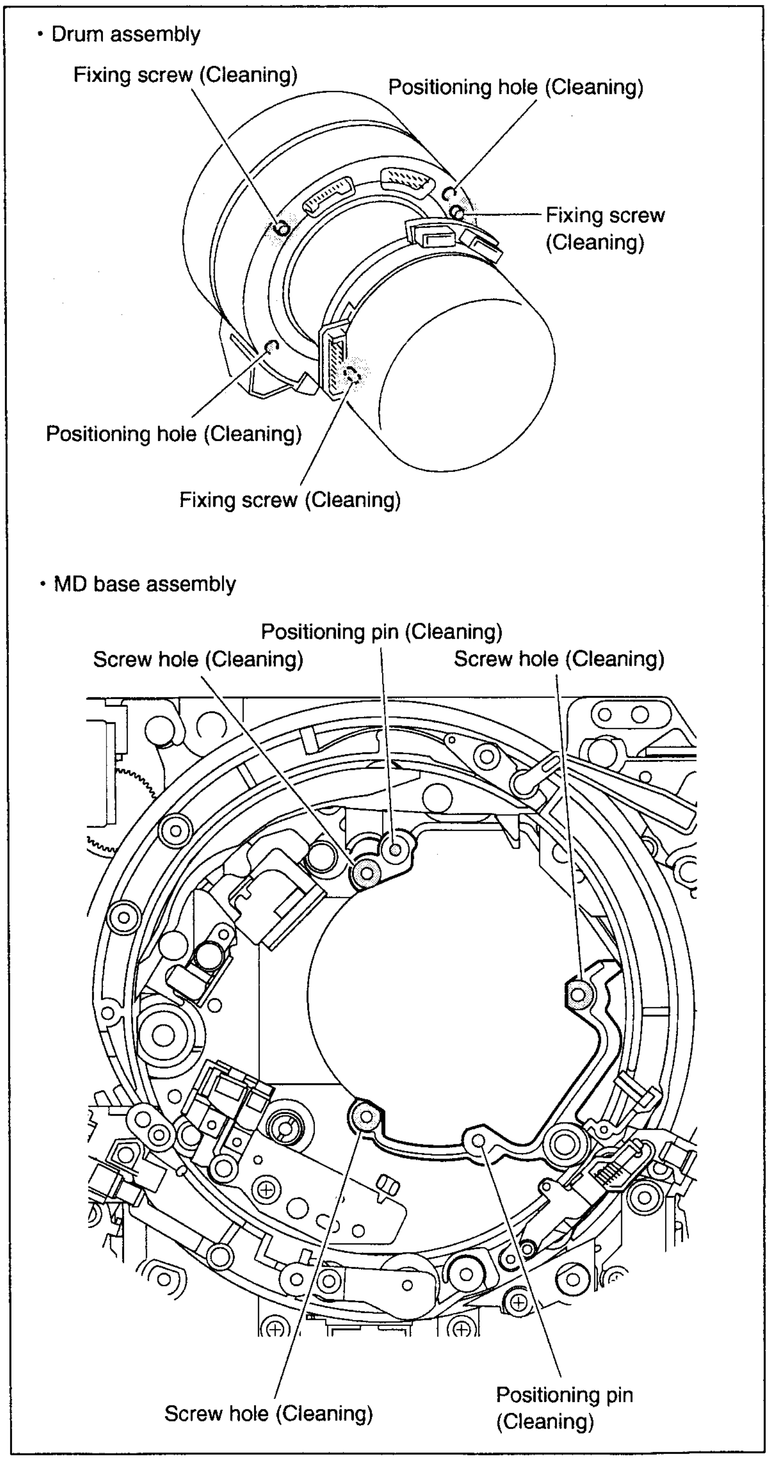
Installation

3. Cleaning

Clean the new drum assembly mounting surfaces and MD base assembly mounting surfaces with a cleaning cloth moistened with cleaning fluid.

CAUTION

After cleaning, wipe with a dry cleaning cloth.



• Drum assembly

Fixing screw (Cleaning)
Positioning hole (Cleaning)
Fixing screw (Cleaning)
Positioning hole (Cleaning)
Fixing screw (Cleaning)

• MD base assembly

Positioning pin (Cleaning)
Screw hole (Cleaning)
Screw hole (Cleaning)
Screw hole (Cleaning)
Positioning pin (Cleaning)

Cleaning

4. Attaching the Drum Assembly

(1) **For HDW-M, HDW-S, DVW-M and MSW-M series only**
While matching the slotted hole of the DU-107 board (demagnetization head) with the positioning boss A of the drum support, match the demagnetization head with the hole of the drum support.

(2) **For HDW-M, HDW-S, DVW-M and MSW-M series only**
Match the positioning hole of the spring plate with the positioning boss B of the drum support and fasten with a screw.
After the attachment, check that the top of the spring plate pushes the DU-107 board.

(3) Hold the drum assembly as shown in the figure and connect the three drum harnesses disconnected in (9) of step 2 to the connectors of drum assembly.

Notes

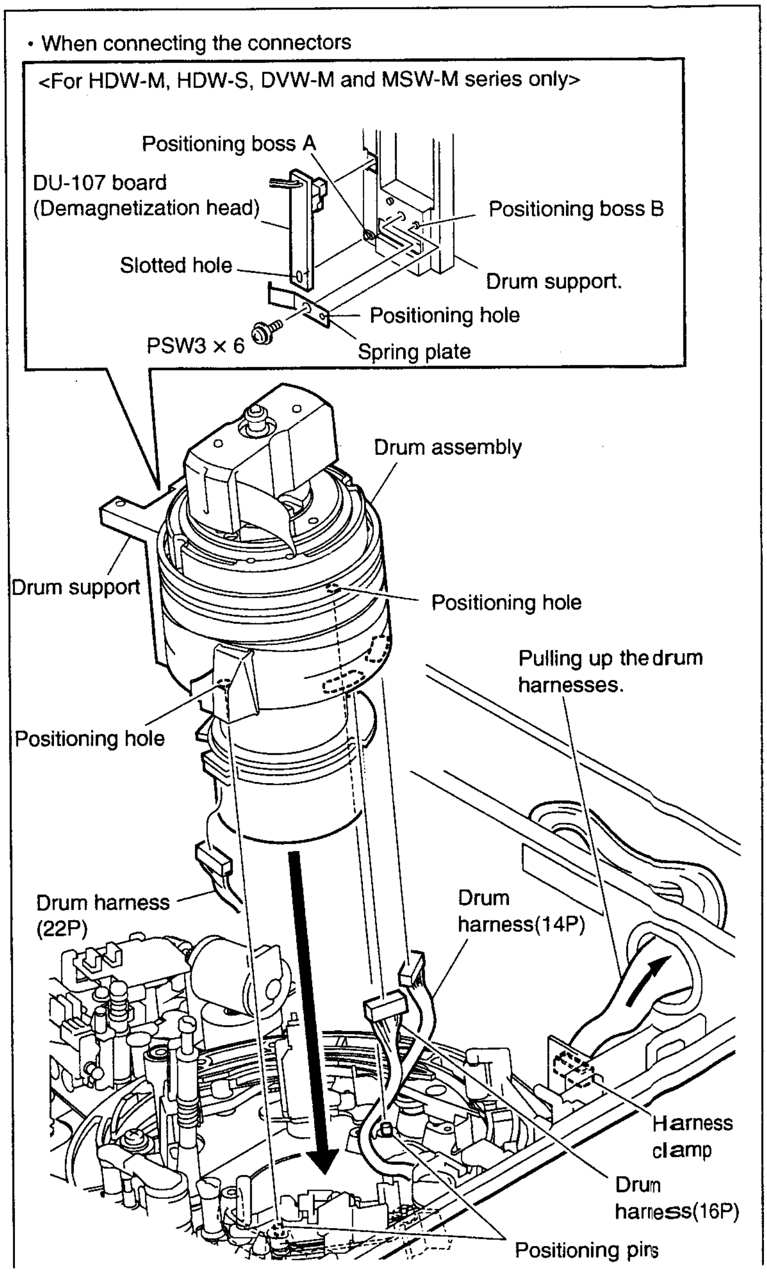
- Hold the drum support, not to hold the upper drum and the brush slip ring assembly.
- Pay attention to the orientation of the connectors.

(4) Align the two positioning holes of the drum assembly with the two positioning pins of the MD base assembly while pulling up the drum harnesses shown in the figure.

Notes

- Avoid pulling the drum harnesses forcibly, or the harnesses may come off the drum assembly.
- Be careful not to touch the CTL/TC head and tape guide at that time.
- Be careful not to put the harnesses between the lower drum and the MD base assembly.

(5) Confirm that the drum assembly is firmly inserted into the positioning pins.


• When connecting the connectors
<For HDW-M, HDW-S, DVW-M and MSW-M series only>
Positioning boss A
DU-107 board
(Demagnetization head)
Positioning boss B
Slotted hole
Drum support.
Positioning hole
PSW3 x 6
Spring plate
Drum assembly
Drum support
Positioning hole
Pulling up the drum harnesses.
Positioning hole
Drum harness
(22P)
Drum
harness(14P)
Harness
clamp
Drum
harness(16P)
Positioning pins

(6) Turn the upper drum assembly manually counterclockwise and align the ⇨ mark of the board cover with the fixing screw position.

(7) Tighten the screw temporarily.

(8) Tighten other two screws temporarily in the same way in steps (6) and (7).

(9) Tighten the three screws in turns counterclockwise for each by two or three turns.
Tightening torque: 78.4×10^{-2} N•m
{8 kgf•cm}

(10) Retract the drum harnesses to the EQ-84 board side and fix with the harness clamp of the EQ-84 board.

(11) Attach the EQ-84 board together with the AU-272 board.

(12) **For HDW-M, HDW-S, DVW-M and MSW-M series only**
Connect the harness which has been removed in (5) of step 2 to the connector CN600 and fix with a harness clamp.

(13) Connect the flexible board into the connector CN220 on the DT-47 board, then lock.

5. Cleaning

Clean the portions below.

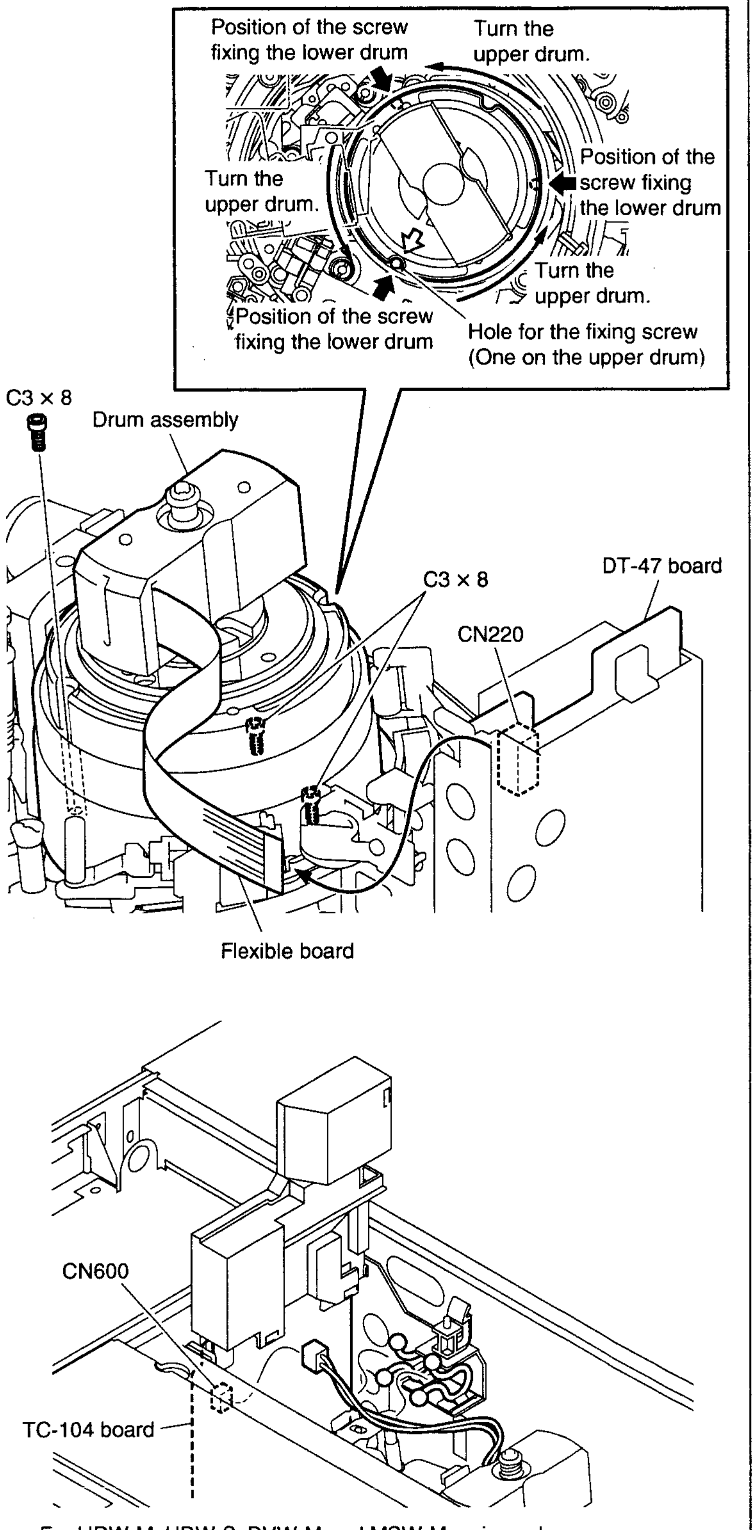
(1) Upper drum's tape running surface and video heads. (Refer to Section 4-2-3.)

(2) Lower drum's tape running surface and lead surface. (Refer to Section 4-2-4.)

Note

After cleaning, wipe with a dry cleaning cloth.

- When installing the drum assembly


Position of the screw fixing the lower drum
Turn the upper drum.
Turn the upper drum.
Position of the screw fixing the lower drum
Turn the upper drum.
Position of the screw fixing the lower drum
Hole for the fixing screw (One on the upper drum)
C3 x 8
Drum assembly
C3 x 8
DT-47 board
CN220
Flexible board
CN600
TC-104 board

<For HDW-M, HDW-S, DVW-M and MSW-M series only>

Attach the Drum Assembly

6. Reattaching the W Cleaner Assembly

Reattach the W cleaner assembly.
(Refer to steps 4 to 6 in Section 5-5.)

Adjustment after Replacement

7. Confirming the Drum Motor Operation

Refer to Section 3-2-2.
(C015 : DRUM)

8. Adjusting the Tape Running

MSW Recorder	⇨ Refer to Section 6-2.
MSW Player	⇨ Refer to Section 6-3.
HDW Recorder	⇨ Refer to Section 6-4.
HVW Player	⇨ Refer to Section 6-5.
DVW Recorder	⇨ Refer to Section 6-6.

9. Confirming the Tape Running

Refer to Section 6-7.

10. Electrical Adjustment after Replacing the Drum

Refer to Section 7-2.

5-4. Brush Slip Ring Assembly Replacement

Outline

Replacement

1. Removing the Brush Slip Ring Assembly
2. Cleaning (DR-341 board's contacting points and Brush slip ring assembly mounting surface)
3. Attaching the Brush Slip Ring Assembly

Note

When the brush or slip ring was worn or damaged, replace the brush slip ring assembly. A single brush or slip ring cannot be replaced.

Tools

• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Brush Slip Ring Assembly

(1) Disconnect the flexible board from the connector CN220 on the DT-47 board.

(2) Fully loosen the two screws, then remove the brush slip ring assembly.

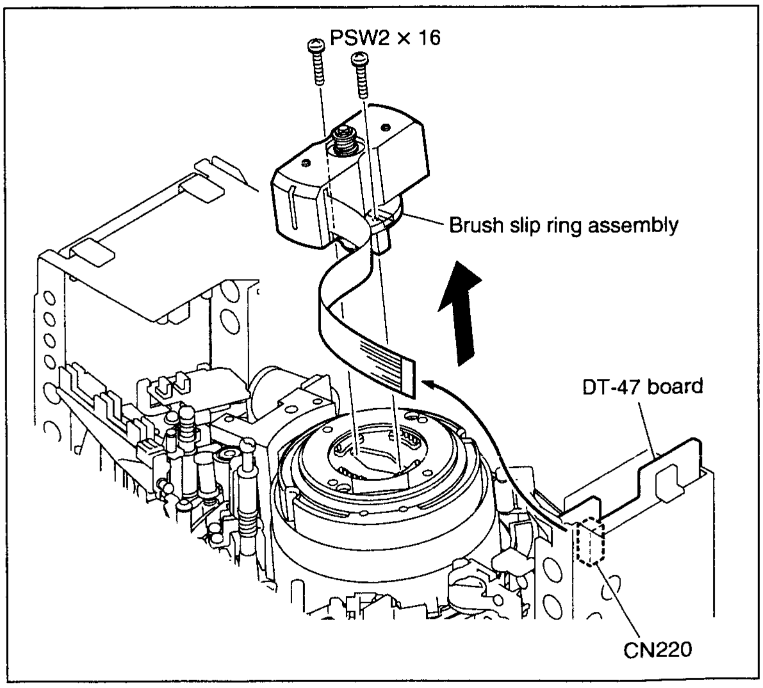
Note

Do not apply excessive force to the brush slip ring assembly at that time.

(3) Turn the brush slip ring assembly upside down, and take out the two screws.

Note

Use care not to fall the screws into the cover of the brush slip ring assembly.



Remove the Brush Slip Ring Assembly

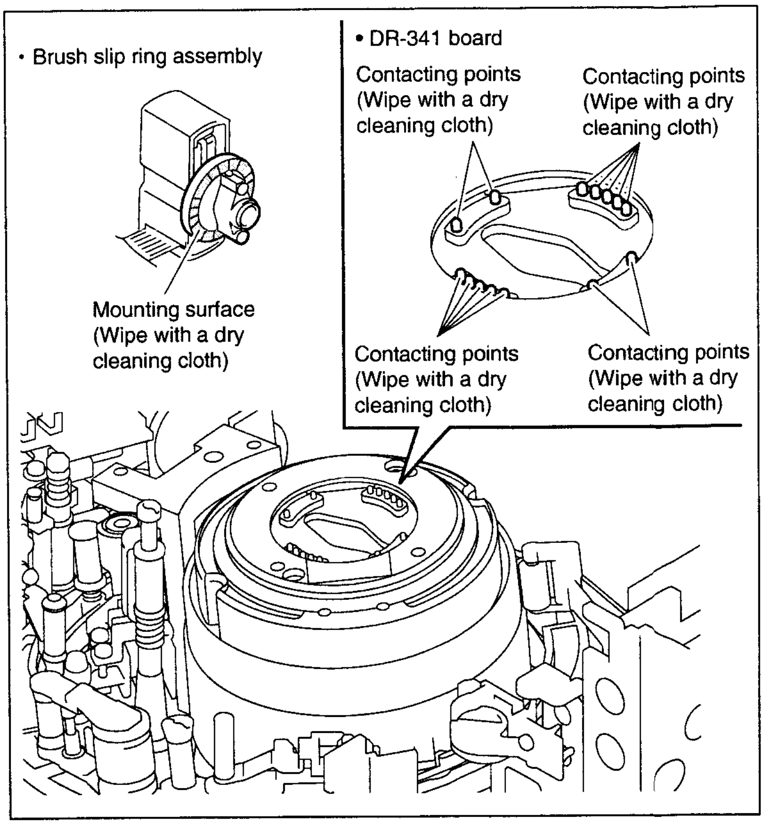
Installation

2. Cleaning

Wipe the brush slip ring assembly mounting surface (shaded portion in the figure) and the DR-341 board contacting points with a dry cleaning cloth.

Note

Never apply the cleaning fluid to the contacting points.


• Brush slip ring assembly
Mounting surface (Wipe with a dry cleaning cloth)
• DR-341 board
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)
Contacting points (Wipe with a dry cleaning cloth)

Cleaning

3. Attaching the Brush Slip Ring Assembly

(1) Insert the two screws taken out in (3) of step 1 into the screw holes of the brush slip ring assembly.

(2) Insert the brush slip ring assembly into the upper drum assembly as shown in the figure.

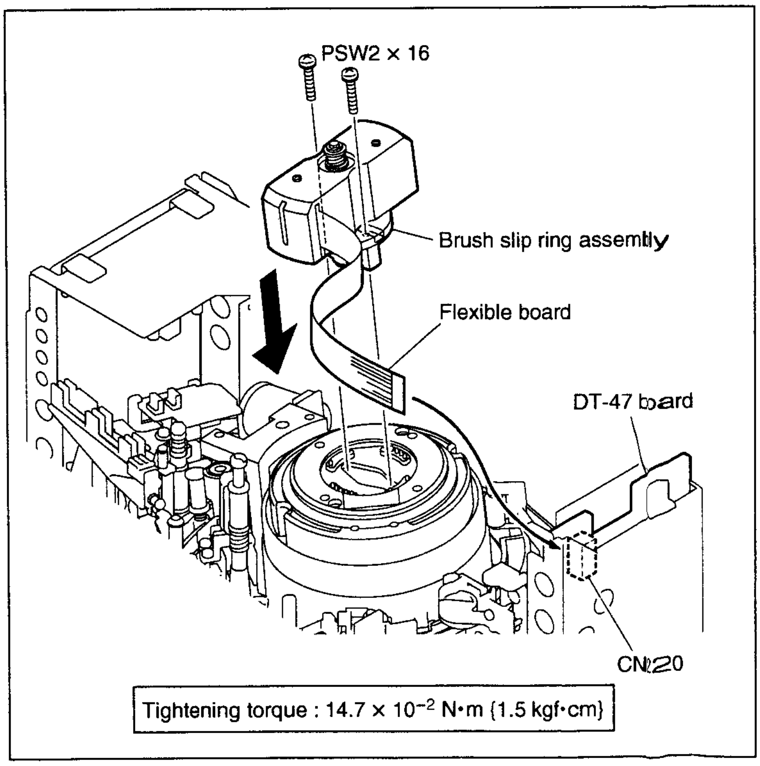
(3) Tighten the two screws alternately while pushing both sides of the flange equally from above.

Tightening torque: 14.7×10^{-2} N•m {1.5 kgf•cm}

Note

Never apply excessive force to the cover.

(4) Connect the flexible board into the connector CN220 on the DT-47 board, then lock.


PSW2 x 16
Brush slip ring assembly
Flexible board
DT-47 board
CN220
Tightening torque : 14.7 x 10⁻² N•m {1.5 kgf•cm}

Attach the Brush Slip Ring Assembly

5-5. W Cleaner Assembly and Cleaning Roller Replacement

Outline

Replacement

1. Disconnecting the Harnesses (CN231, CN232/HN-268 board)
2. Removing the W Cleaner Assembly
3. Replacing the Cleaning Roller
4. Attaching the W Cleaner Assembly
5. Confirming the Cleaning Roller Position
6. Reconnecting the Harnesses (CN231, CN232/HN-268 board)

Adjustment after Replacement

7. Confirming the Cleaning Roller Solenoid Operation
   (C023: CLEANING ROLLER)
   (Refer to Section 3-2-2.)

Preparation

1. Turn the power off and disconnect the power code.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Disconnecting the Harness

(1) Disconnect two harnesses from the connectors CN231 and CN232 on the HN-268 board.

(2) Release the bundling band.

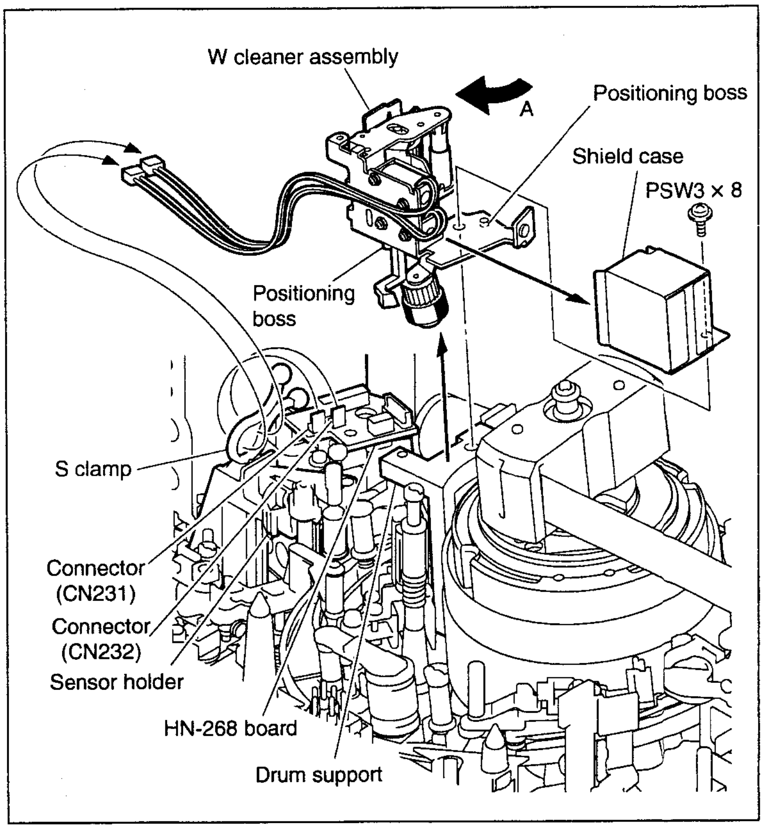
(3) Remove two harnesses of the W cleaner assembly from the S clamp.

2. Removing the W Cleaner Assembly

(1) Remove the screw.

(2) Shift the W cleaner assembly in the direction of arrow A, and raise it from the drum support.

(3) Remove the shield case in the direction of arrow.


W cleaner assembly
A
Positioning boss
Shield case
PSW3 x 8
Positioning boss
S clamp
Connector (CN231)
Connector (CN232)
Sensor holder
HN-268 board
Drum support

Remove the W Cleaner Assembly

3. Replacing the Cleaning Roller

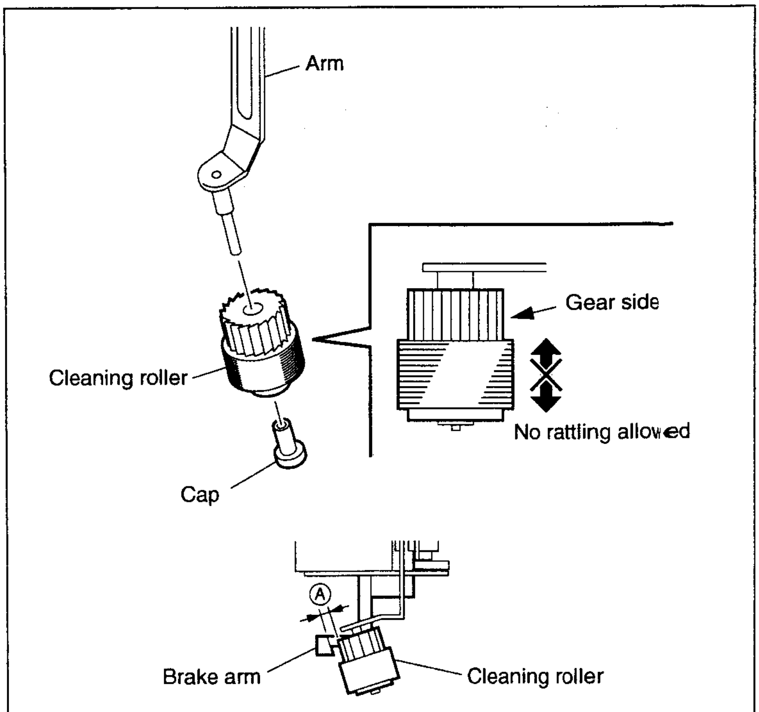
(1) Remove the cap, and remove the cleaning roller.

(2) Pass a new cleaning roller through the shaft positioning as shown in the figure. Then fix the cleaning roller by new cap.

Notes

- The cleaning roller should not be rattled against the shaft.
- Be careful not to change the form of the arm when attaching the cap.

(3) Visually check that the cleaning roller does not come in contact with the tip of the brake arm. (Spec. 1)


Arm
Gear side
Cleaning roller
No rattling allowed
Cap
Ⓐ
Brake arm
Cleaning roller

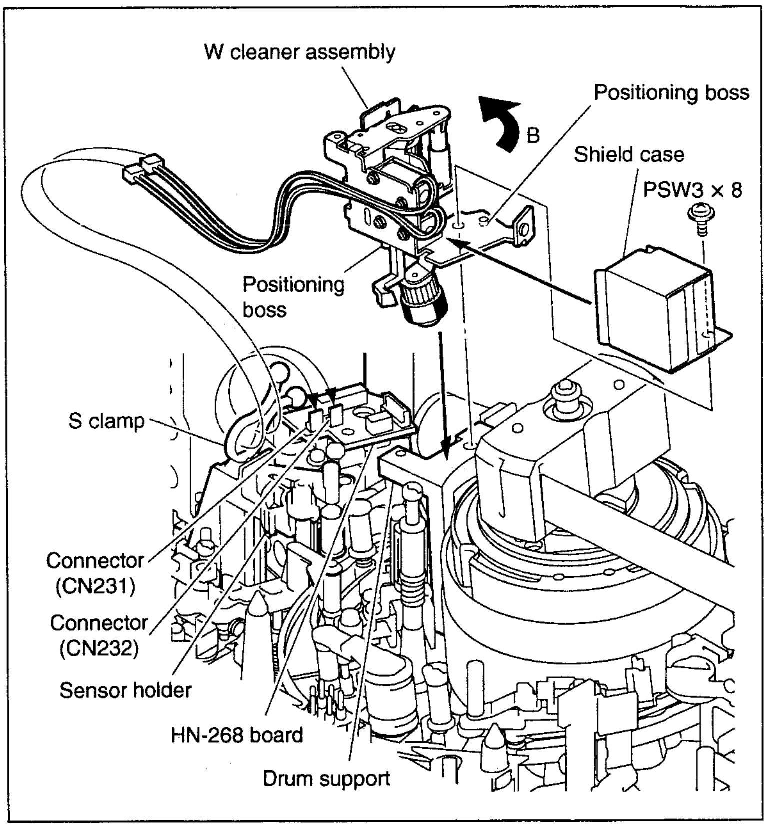
Spec.1: Ⓐ = Clearance exists.

Replace the Cleaning Roller

Installation

4. Attaching the W Cleaner Assembly

(1) Arrange the harnesses as shown in the figure and attach the shield case to the W cleaner assembly.
(2) Insert the cleaning roller from the clearance between the drum support and capstan motor.
(3) Align the two positioning boss of the W cleaner assembly with the two holes of the drum support.
(4) Tighten the screw while pressing the W cleaner assembly in the direction of arrow B.

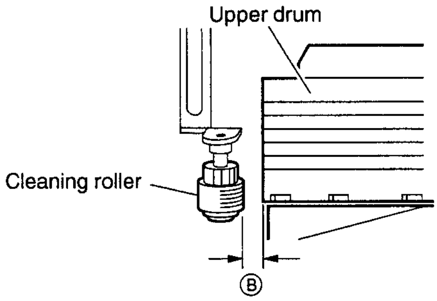

W cleaner assembly
Positioning boss
B
Shield case
PSW3 x 8
Positioning boss
S clamp
Connector (CN231)
Connector (CN232)
Sensor holder
HN-268 board
Drum support

Attach the W Cleaner Assembly

5. Confirming the Cleaning Roller Position

Visually check that the cleaning roller does not come in contact with the upper drum. (Spec.2)

When the specification 2 is not satisfied, remove and attach the W cleaner assembly again.


Upper drum
Cleaning roller
Ⓑ

Spec.2: Ⓑ = Clearance exists.

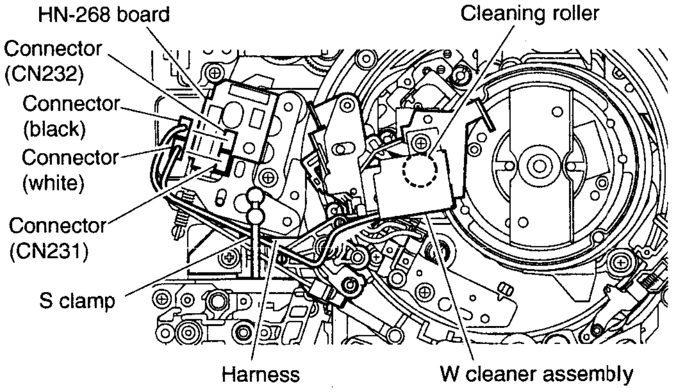
Confirm the Cleaning Roller Position

6. Reconnecting the Harnesses

(1) As shown in the figure, fix two harnesses of W cleaner assembly with other harnesses using a bundling band (or equivalent).

(2) Fix the harnesses of W cleaner assemby as shown in the figure.

(3) Reconnect the harnesses to the connectors CN231 and CN232 on the HN-268 board.


HN-268 board
Cleaning roller
Connector (CN232)
Connector (black)
Connector (white)
Connector (CN231)
S clamp
Harness
W cleaner assembly

Connect the Harnesses

Adjustment after Replacement

7. Confirming the Cleaning Roller Solenoid Operation

Refer to Section 3-2-2.
(C023: CLEANING ROLLER)

5-6. AT Head Cleaner Replacement

When the AT head cleaner becomes dirty or is damaged, replace the CL arm assembly.

Outline

Replacement

1. Removing the CL Arm Assembly
2. Attaching the CL Arm Assembly

Adjustment after Replacement

3. Confirming the CL Arm Assembly Operation
4. Confirming the Threading Operation

Note

- Adjustment after the CL arm assembly replacement is not required. However, confirm the CL arm assembly operation.
- Prepare a new stop washer when replacing the CL arm assembly.
  Stop washer (2.3): 3-669-596-00

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Removing the CL Arm Assembly

(1) Turn the M gear of the gear box assembly manually in the direction of the arrow to move the CL arm assembly to the position shown in the figure.

Note

Move the CL arm assembly to the front of the DT-47 board. Otherwise, the CL arm assembly cannot be removed because the stop washer is hidden by other parts.

(2) Remove the stop washer at the top of the CL arm assembly.

(3) Remove the CL arm assembly from the threading ring.

Note

Do not remove the spring at the bottom of the CL arm assembly from the shaft.

Installation

2. Attaching the CL Arm Assembly

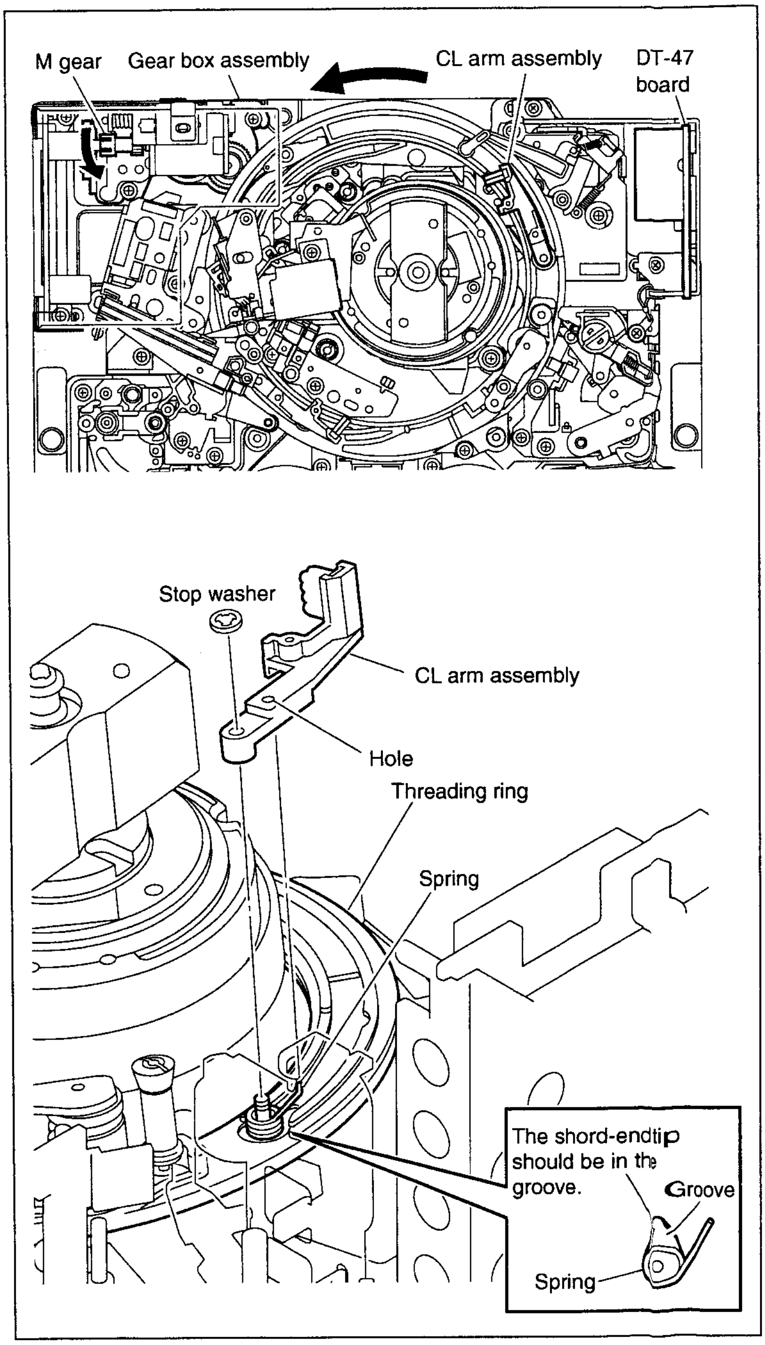
(1) Pass a new CL arm assembly through the shaft while hooking the spring as shown in the figure.

Note

Insert the short-end of spring into the groove of the threading ring and the long-end of spring into the hole of the CL arm assembly.

(2) Fix the CL arm assembly by a new stop washer.

Stop washer (2.3): 3-669-596-00


M gear
Gear box assembly
CL arm assembly
DT-47 board
Stop washer
CL arm assembly
Hole
Threading ring
Spring
The shord-endtip should be in the groove.
Groove
Spring

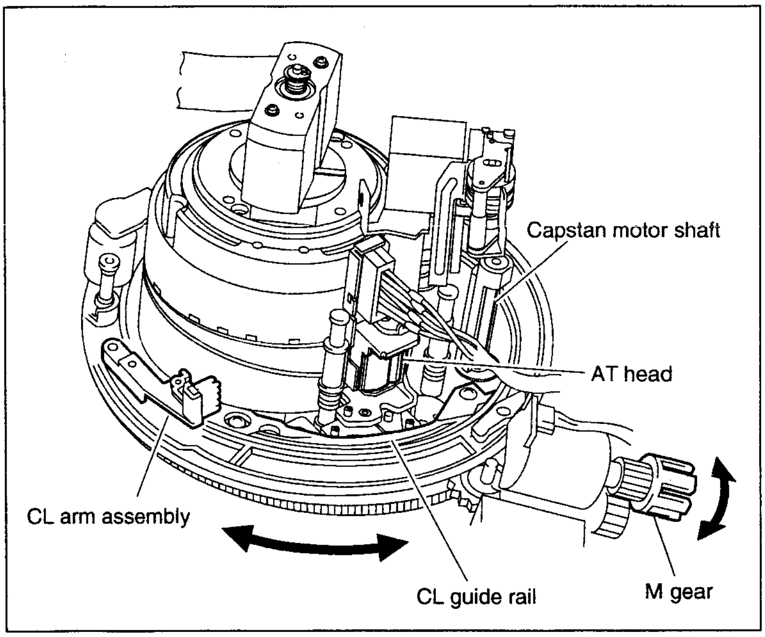
Remove/Attach the CL Arm Assembly

Adjustment after Replacement

3. Confirming the CL Arm Assembly Operation

Turn the M gear of the gear box assembly manually and confirm the items below while repeating the threading and unthreading.

- The CL arm assembly moves along the CL guide rail.
- The cleaning roller cleans the CTL/TC head and capstan motor shaft.


Capstan motor shaft
AT head
CL arm assembly
CL guide rail
M gear

Confirm the CL Arm Assembly Operation

4. Confirming the Threading Operation

Refer to Section 3-2-2.
(C012 : THREADING)

5-7. CTL Head or Full-erase Head Replacement

When it is necessary to replace the CTL head or the full-erase head, replace with the CTL/FE head assembly.

Note

No full-erase head is supplied to the player.

Outline

Replacement

1. Removing the CTL/FE Head Assembly
2. Attaching the CTL/FE Head Assembly
3. Cleaning (Full-erase head and CTL head)

Adjustment after Replacement

4. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
5. Confirming the Tape Running (Refer to Section 6-7.)
6. Adjusting the Drum Phase (Refer to Section 7-2-3.)
7. Full Erasure Current Check (Refer to Section 8-10-4.)

Note

Never turn the screws in the CTL/FE head assembly. (Except when adjustment)

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Turn the power off and disconnect the power code.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the CTL/FE Head Assembly

(1) Disconnect the harnesses (Two for recorder, one for player) from the connectors of the CTL/FE head assembly.

(2) Remove the one screw.

(3) Remove the CTL/FE head assembly from the MD base assembly.

Note

Be careful not to touch the drum (especially, video heads). Also, take care not to damage the peripheral tape guides.

Installation

2. Attaching the CTL/FE Head Assembly

(1) Peel off the protection tape from the new CTL/FE head assembly.

(2) Confirm that the threading ring is in the unthreading end state.

(3) Put the slotted holes A and B of the CTL/FE head assembly into the bosses of the chassis.

Note

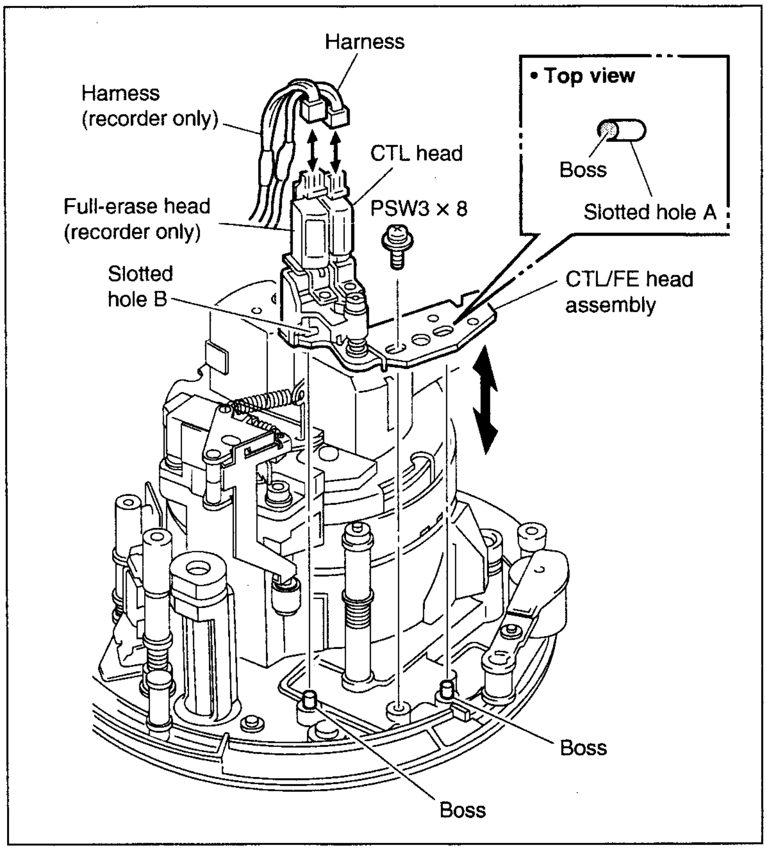
Be careful not to touch the drum (especially, video heads). Also, take care not to damage the peripheral tape guides.

(4) Place the boss of the chassis in the left side of the slotted hole A and tighten the screw.

(5) Connect the harnesses (Two for recorder, one for player) to the connectors of CTL/FE head assembly.

3. Cleaning

Clean the tape-running surfaces of the CTL head and the full-erase head using a cleaning cloth moistened with cleaning fluid.
(Refer to Section 4-2-5.)


Harness
Harness (recorder only)
CTL head
Full-erase head (recorder only)
PSW3 x 8
Slotted hole B
• Top view
Boss
Slotted hole A
CTL/FE head assembly
Boss
Boss

Remove/Attach the CTL/FE Head Assembly

Adjustment after Replacement

4. Adjusting the Tape Running

MSW Recorder	⇨ Refer to Section 6-2.
MSW Player	⇨ Refer to Section 6-3.
HDW Recorder	⇨ Refer to Section 6-4.
HDW Player	⇨ Refer to Section 6-5.
DVW Recorder	⇨ Refer to Section 6-6.

5. Confirming the Tape Running

Refer to Section 6-7.

6. Adjusting the Drum Phase

Refer to Section 7-2-3.

7. Full Erasure Current Check

Refer to Section 8-10-4.

5-8. AT Head Assembly Replacement

When it is necessary to replace the AT head or the AT erase head, replace with the AT head assembly.

Outline

Replacement

1. Removing the CL Guide Rail
2. Removing the AT Head Assembly
3. Attaching the AT Head Assembly
4. Reattaching the CL Guide Rail
5. Cleaning (AT Head)

Adjustment after Replacement

6. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
7. Confirming the Tape Running (Refer to Section 6-7.)
8. Electrical Adjustment after Replacing the AT Head (Refer to Section 7-3.)

Note

Never turn the screw in the AT head assembly. (Except when adjustment)

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

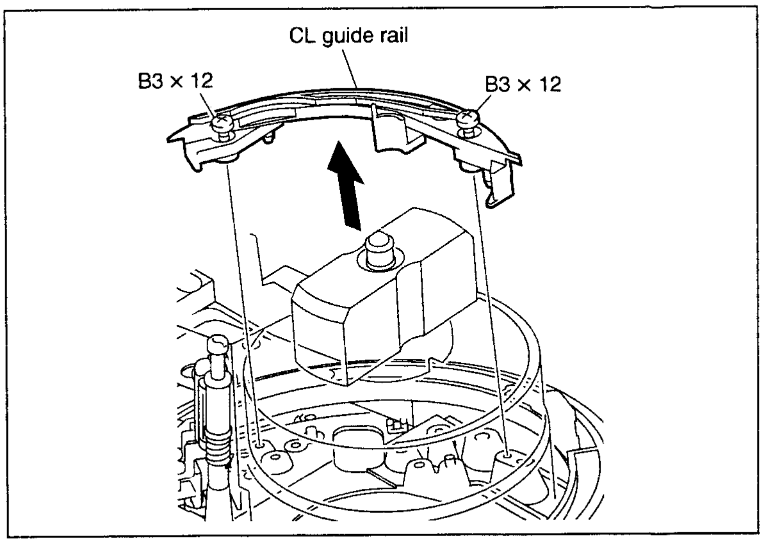
Removal

1. Removing the CL Guide Rail

Loosen the two screws to remove the CL guide rail.

Note

Never pull out the screws from the CL guide rail, because the screw section is designed not to fall.


CL guide rail
B3 x 12
B3 x 12

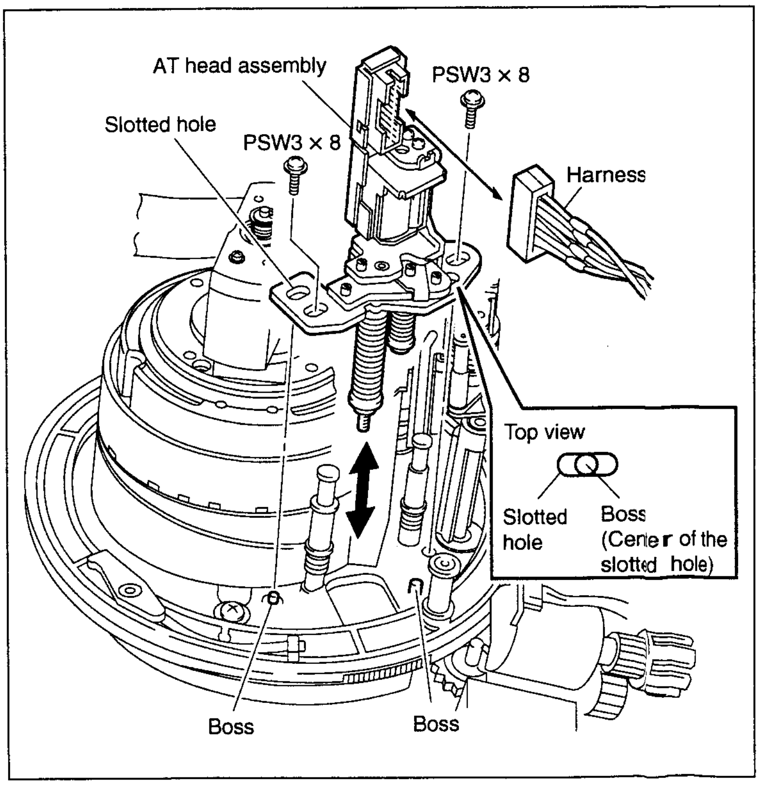
Remove the CL Guide Rail

2. Removing the AT Head Assembly

(1) Disconnect the harness from the connector of the AT head assembly.
(2) Remove the two screws.
(3) Remove the AT head assembly from the MD base assembly.

Note

Be careful not to touch the drum (especially video heads). Also, take care not to damage the peripheral tape guides.


AT head assembly
PSW3 x 8
Slotted hole
PSW3 x 8
Harness
Top view
Slotted hole
Boss (Center of the slotted hole)
Boss
Boss

Remove/Attach the AT Head Assembly

Installation

3. Attaching the AT Head Assembly

(1) Remove the protection tape from the new AT head assembly.
(2) Align the two slotted holes of the AT head assembly with the two bosses of the chassis.

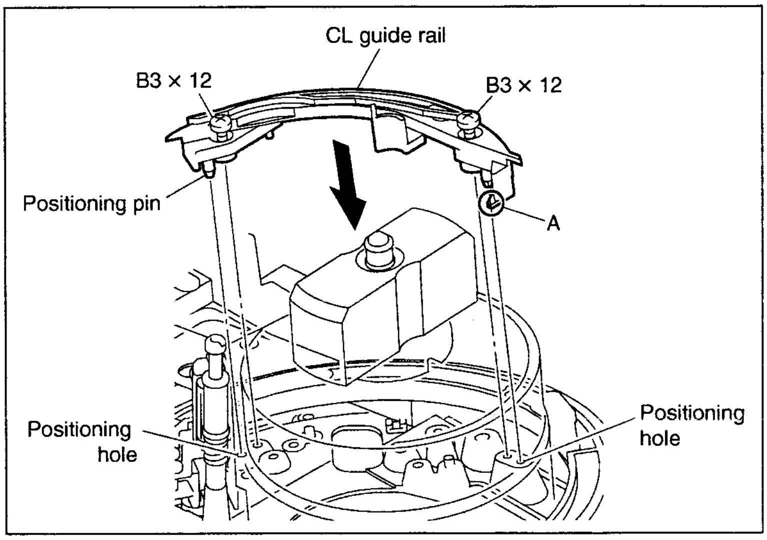
Notes

- Be careful not to touch the drum (especially video heads). Also, take care not to damage the peripheral tape guides.
- Be careful not to damage the AT head surface.

(3) Align the bosses of the chassis in the center of slotted holes and tighten with the two screws.
(4) Connect the harness to the connector of the AT head assembly.

4. Reattaching the CL Guide Rail

(1) Check if the deck is in the unthreading end state.
(2) Insert the portion A of the CL guide rail to the bottom of the drum.
(3) Match and attach the positioning pin of the CL guide rail to the positioning hole of the MD base assembly.
(4) Tighten the two screws.



Reattach the CL Guide Rail

5. Cleaning

Clean the AT head surfaces with a cleaning cloth moistened with cleaning fluid.

Note

After cleaning, wipe with a dry cleaning cloth.

Adjustment after Replacement

6. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

7. Confirming the Tape Running

Refer to Section 6-7.

8. Electrical Adjustment after Replacing the AT Head

Refer to Section 7-3.

5-9. Pinch Roller Replacement

When the pinch roller is damaged or worn, replace the pinch arm assembly.

Outline

Replacement

1. Removing the Pinch Arm Assembly
2. Attaching the Pinch Arm Assembly
3. Adjusting the Pinch Arm Assembly Vertical Play
4. Cleaning (Pinch roller and TG-5)

Adjustment after Replacement

5. Confirming the Pinch Press Clearance
6. Confirming the Pinch Roller Solenoid Operation (Refer to Section 3-2-2.)
7. Confirming the Tape Running at Drum Exit Side (Refer to Section 6-7-2.)
8. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
9. Confirming the Tape Running at Drum Exit Side (Refer to Section 6-7-2.)

Note

Prepare a new stop washer when replacing the pinch arm assembly.
Stop washer (2.3): 3-669-596-00

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Pinch Arm Assembly

(1) Remove the stop washer at the top of the pinch arm assembly.

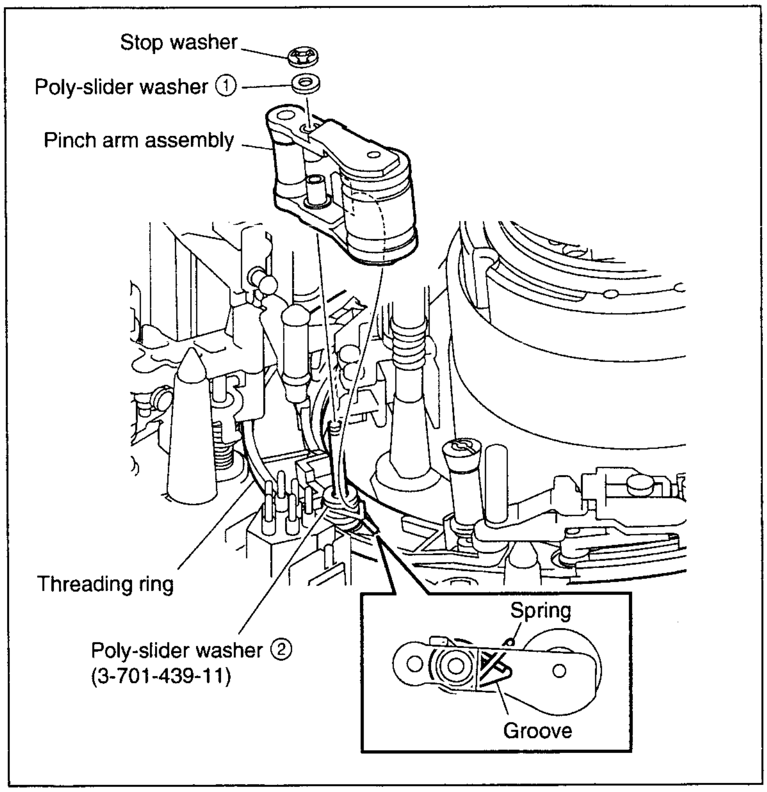
Note

If a poly-slider washer ① (for vertical play adjustment) is inserted between the pinch arm assembly and the stop washer, use care not to lose it.

(2) Remove the pinch arm assembly from the threading ring.

Note

Do not remove the poly-slider washer ② (t = 0.25 mm) and spring at the bottom of the pinch arm assembly from the shaft.


Stop washer
Poly-slider washer ①
Pinch arm assembly
Threading ring
Poly-slider washer ②
(3-701-439-11)
Spring
Groove

Remove/Attach the Pinch Arm Assembly

Installation

2. Attaching the Pinch Arm Assembly

(1) Pass a new pinch arm assembly through the shaft while hooking the spring as shown in the figure.

Notes

Insert the short-end of the spring into the groove of the threading ring and hook the long-end of the spring to the pinch arm assembly.

(2) If the poly-slider washer ① (for vertical play adjustment) was removed in (1) of step 1, pass it again through the shaft.

(3) Fix the pinch arm assembly by a new stop washer.

Stop washer (2.3): 3-660-596-00

3. Adjusting the Pinch Arm Assembly Vertical Play

(1) Push the pinch arm assembly manually in the direction of drum, then release.
At that time, confirm that the pinch arm assembly smoothly returns to the former position.
If the pinch arm assembly does not return smoothly, perform the steps (2) through (4) below.

(2) Remove the stop washer.

(3) Confirm that the poly-slider washer ② is under the pinch arm assembly.

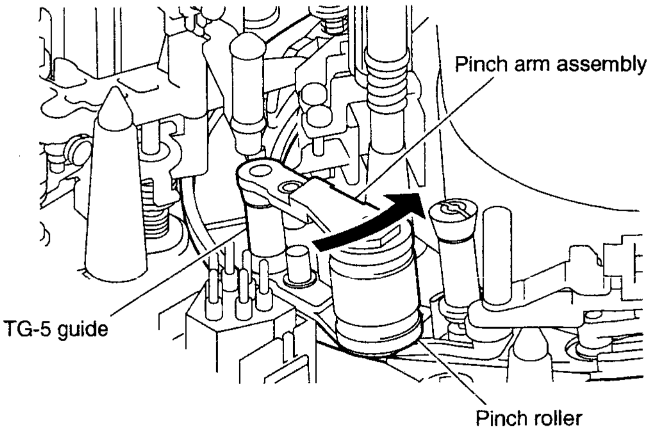
(4) Replace the poly-slider washer ① in the following order and meet the specification in step (1).
1. Poly-slider washer (t = 0.25 mm)
2. Poly-slider washer (t = 0.13 mm)
3. No poly-slider washer

Note

Be sure to perform the confirmation after fixing the pinch arm assembly by the new stop washer.

4. Cleaning

Clean the pinch roller and TG-5 guide surfaces with a cleaning cloth moistened with cleaning fluid. (Refer to Section 4-2-6.)



- Poly-slider washer for adjustment

Diameter	Thickness	Part No.
3.0 mm	0.13 mm	3-701-439-01
	0.25 mm	3-701-439-11

Adjust the Pinch Arm Assembly Vertical Play

Adjustment after Replacement

5. Confirming the Pinch Press Clearance

(1) Turn the M gear of the gearbox assembly by manual to set to the threading end state.

(2) Press the iron core of the pinch solenoid in the pull-in direction and confirm that the clearance between the press arm (A) and (B) is met the specification.

6. Confirming the Pinch Roller Solenoid Operation

Refer to Section 3-2-2.
(C020: PINCH ROLLER)

7. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

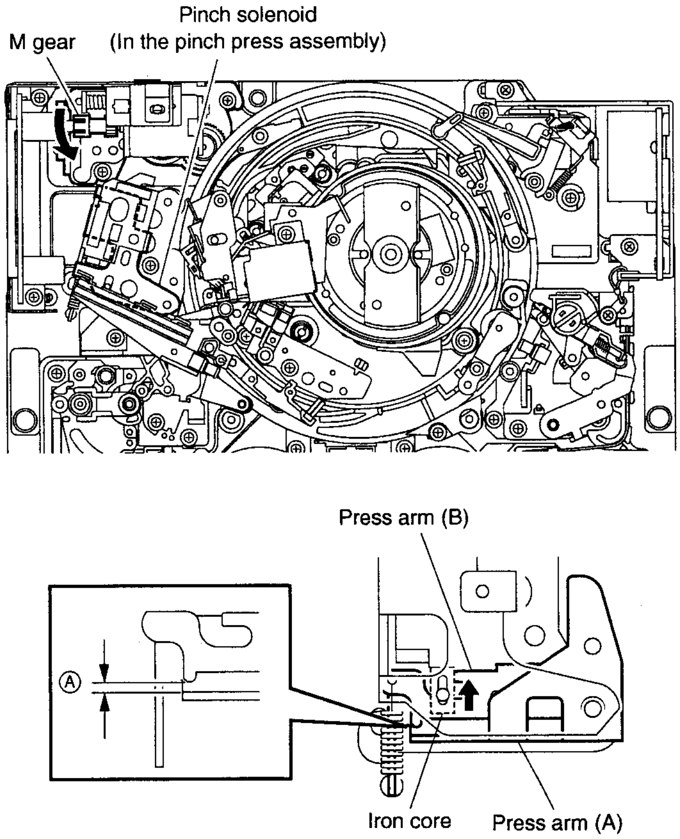
8. Confirming and Adjusting the Tape Path

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

9. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

• Threading end mode



Spec : Ⓐ = Clearance exists.

Confirming the Pinch Press Clearance

5-10. Pinch Press Assembly Replacement

Outline

Replacement

1. Disconnecting the Harnesses (CN216, CN231, CN232, CN233/HN-268 board)
2. Removing the Pinch Press Assembly
3. Attaching the Pinch Press Assembly
4. Reconnecting the Harnesses (CN216, CN231, CN232, CN233/HN268 board)
5. Confirming the Pinch Press Clearance

Adjustment after Replacement

6. Confirming the Pinch Roller Solenoid Operation
   (C020: PINCH ROLLER) (Refer to Section 3-2-2.)
7. Confirming the Tape Running at Drum Exit Side
   Refer to Section 6-7-2.
8. Confirming and Adjusting the Tape Path
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
9. Confirming the Tape Running at Drum Exit Side
   Refer to Section 6-7-2.

Note

The solenoid position, etc. of the pinch press assembly is already adjusted at the factory.
Never turn the screws other than the mounting screws when removing/attaching.

Tools

• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)
   Note
   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Disconnecting the Harnesses

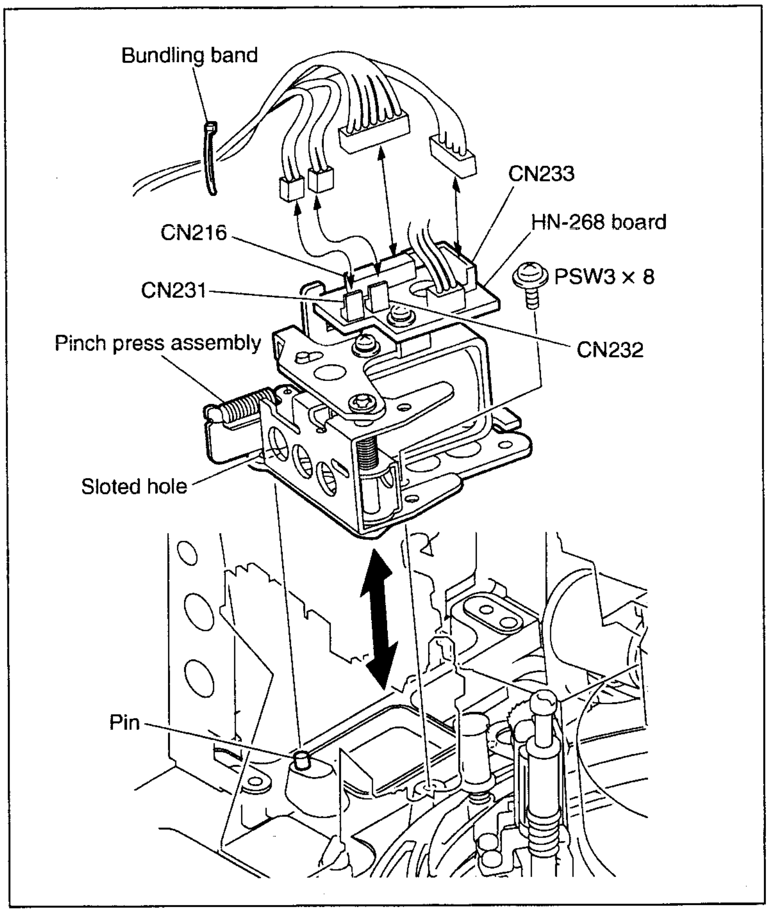
(1) Release the bundling band.

(2) Disconnect the harnesses from the four connectors CN216, CN231, CN232 and CN233 on the HN-268 board.

2. Removing the Pinch Press Assembly

(1) Remove the screw.

(2) Remove the pinch press assembly from the MD base assembly.



Remove/Attach the Pinch Press Assembly

Installation

3. Attaching the Pinch Press Assembly

(1) Align the sloted hole of the pinch press assembly with the pin of the MD base assembly

(2) Fix the pinch press assembly with one screw.
Tightening torque : 78.4×10^{-2} N•m
{8.0 kgf•cm}

4. Reconnecting the Harnesses

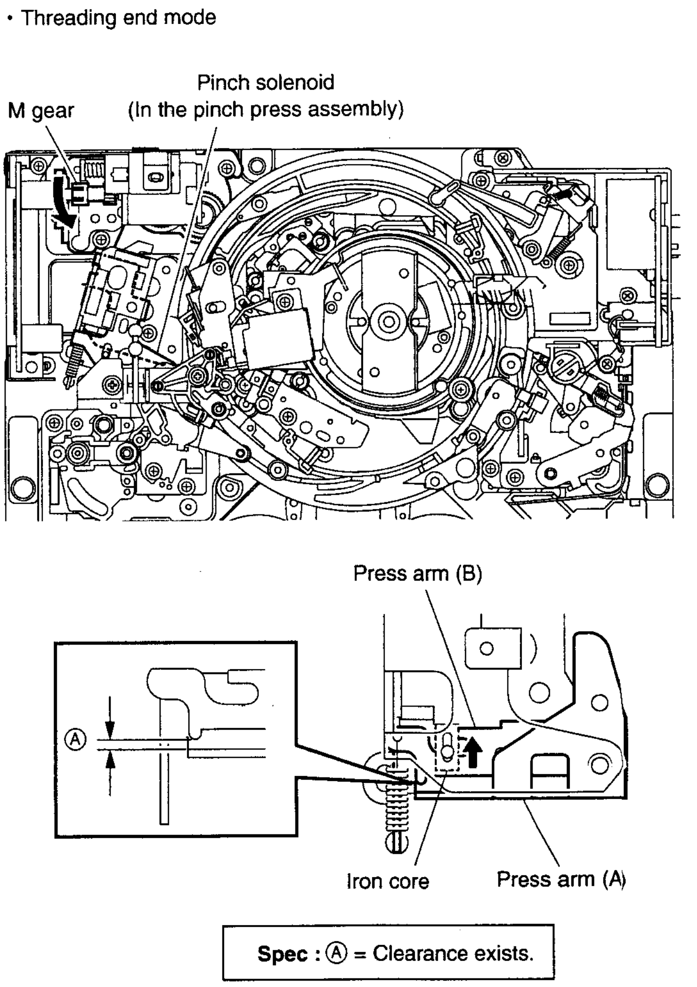
(1) Reconnect the harnesses to the four connectors CN216, CN231, CN232 and CN233 on the HN-268 board.

(2) Fix the harnesses with the bundling band (or an equivalent) avoiding contact to the drive portion of the gearbox assembly.

5. Confirming the Pinch Press Clearance

(1) Turn the M gear of the gearbox assembly by manual to set to the threading end state.

(2) Press the iron core of the pinch solenoid in the pull-in direction and confirm that the clearance between the press arm (A) and (B) is met the specification.


• Threading end mode
M gear
Pinch solenoid
(In the pinch press assembly)
Press arm (B)
Ⓐ
Iron core
Press arm (A)
Spec : Ⓐ = Clearance exists.

Confirming the Pinch Press Clearance

Adjustment after Replacement

6. Confirming the Pinch Roller Solenoid Operation

Refer to Section 3-2-2.
(C020: PINCH ROLLER)

7. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

8. Confirming and Adjusting the Tape Path

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

9. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

5-11. Capstan Motor Replacement

Outline

Replacement

1. Removing the W Cleaner Assembly (Refer to steps 1 and 2 in Section 5-5.)
2. Opening the DR-414/508 Board
3. Removing the Capstan Motor
4. Attaching the Capstan Motor
5. Closing the DR-414/508 Board
6. Cleaning (Capstan Motor Shaft)
7. Reattaching the W Cleaner Assembly (Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

8. Confirming the Pinch Press Clearance (Refer to Section 5-10.)
9. Confirming the Tape Running at Drum Exit Side (Refer to Section 6-7-2.)
10. Adjusting the Tape Running
    MSW Recorder ⇨ Refer to Section 6-2.
    MSW Player ⇨ Refer to Section 6-3.
    HDW Recorder ⇨ Refer to Section 6-4.
    HDW Player ⇨ Refer to Section 6-5.
    DVW Recorder ⇨ Refer to Section 6-6.
11. Confirming the Tape Running at Drum Exit Side (Refer to Section 6-7-2.)
12. Confirming the Capstan Motor Operation
    (C014: CAPSTAN) (Refer to Section 3-2-2.)
13. Performing the Servo Adjustment
    (A000: A001-A00A ADJUST) (Refer to Section 3-3-2.)

Note

Replace the capstan motor with the side panel of the unit down.

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Tape guide adjusting screw driver (MW-261):	J-6322-610-A
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Removing the W Cleaner Assembly

Remove the W cleaner assembly.
(Refer to steps 1 and 2 in Section 5-5.)

Note

To remove the fixing screws of the capstan motor, remove the W cleaner assembly.

2. Opening the DR-414/508 Board

(1) Place the unit with its one side down to remove the bottom plate.
(Refer to Section 1-3-2.)

(2) Disconnect the flexible board from each connector on the reel motors.

Note

Setting the reel tables at the S cassette position will ease the operation.
(Refer to Section 5-1-3.)

(3) Fully loosen the three screws on the DR-414/508 board.

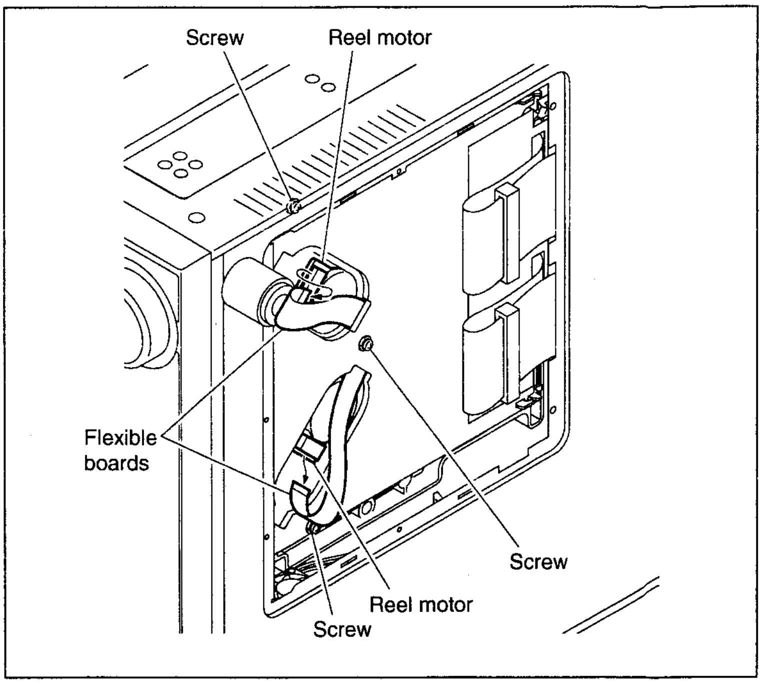
Note

These screws should not be removed necessarily.

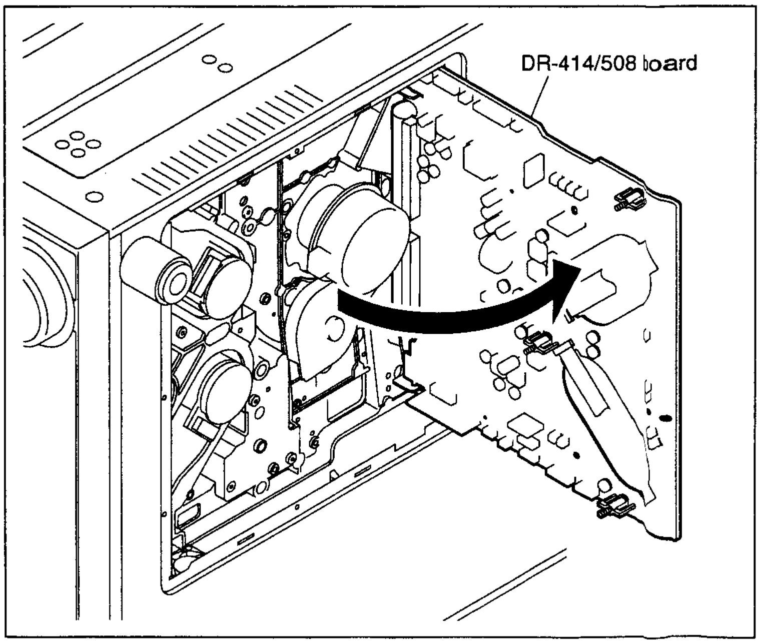
(4) Open the DR-414/508 board in the arrow direction.

Note

Open the board slowly so that excessive force is not applied to the connected harnesses.



Remove the Flexible Board



Opening the DR-414/508 Board

3. Removing the Capstan Motor

(1) Disconnect the harness from the connector on the capstan motor. (Bottom side)

(2) Remove the two screws while holding the capstan motor by hand.

Note

Be careful not to drop the capstan motor.

(3) Remove the capstan motor.

Installation

4. Attaching the Capstan Motor

(1) Pass a new capstan motor through the hole of the MD base assembly positioning as shown in the figure.

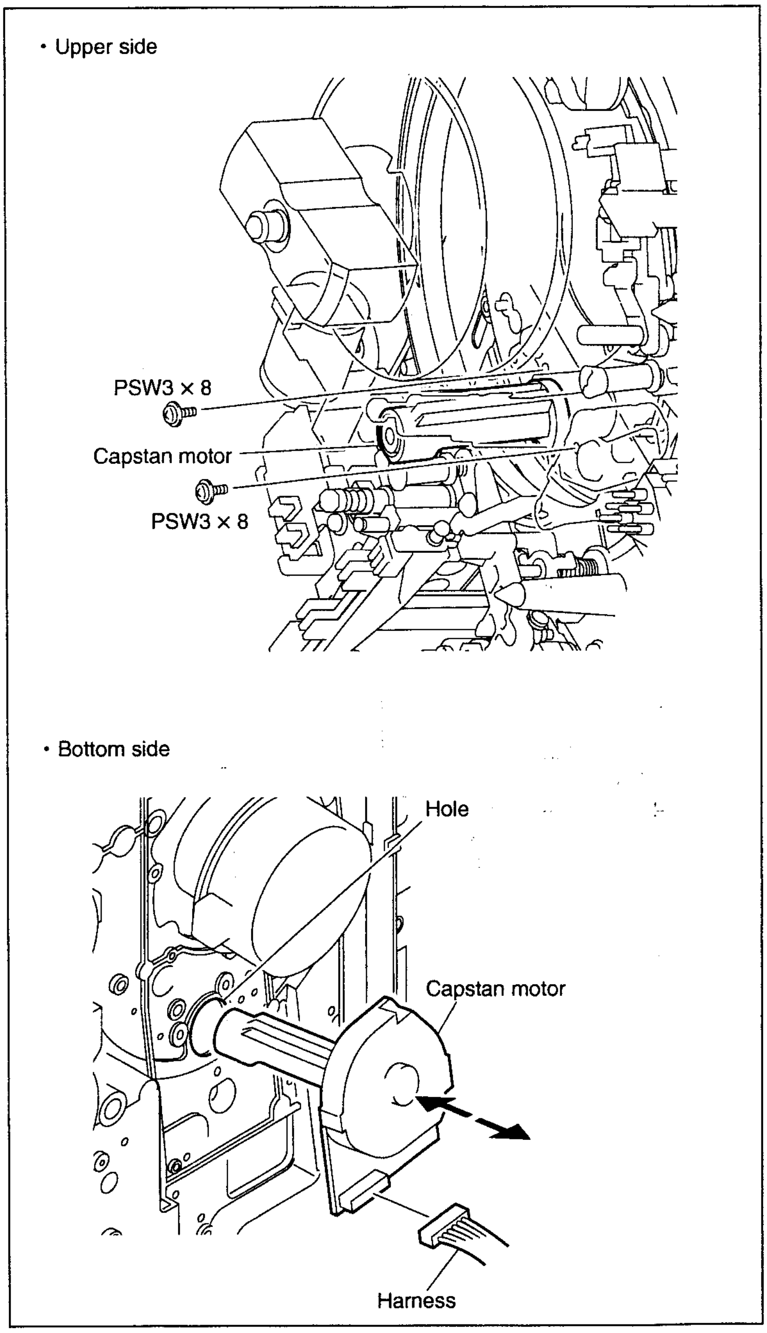
Note

Be careful not to damage the capstan motor shaft when passing the capstan motor through the hole of the MD base assembly.

(2) Tighten the two screws while holding the capstan motor by hand.

Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

(3) Reconnect the harness disconnected in (1) of step 3 to the connector of the capstan motor.



Remove/Attach the Capstan Motor

5. Closing the DR-414/508 Board

(1) Turn the gear of the reel shift motor to move the reel table at the middle position between the S and L cassette positions. (Refer to Section 5-1-3.)

Note

Be careful not to close the DR-414/508 board while the reel table is left at the S or L cassette position. Or the reel position sensor may damage.

(2) Arrange the connected harnesses, then close the DR-414/508 board.

Notes

- Match the positioning hole of the DR-414/508 board with the positioning boss.
- Be sure not to be caught the harness at the hinge portion.

(3) Tighten the three screws on the DR-414/508 board.

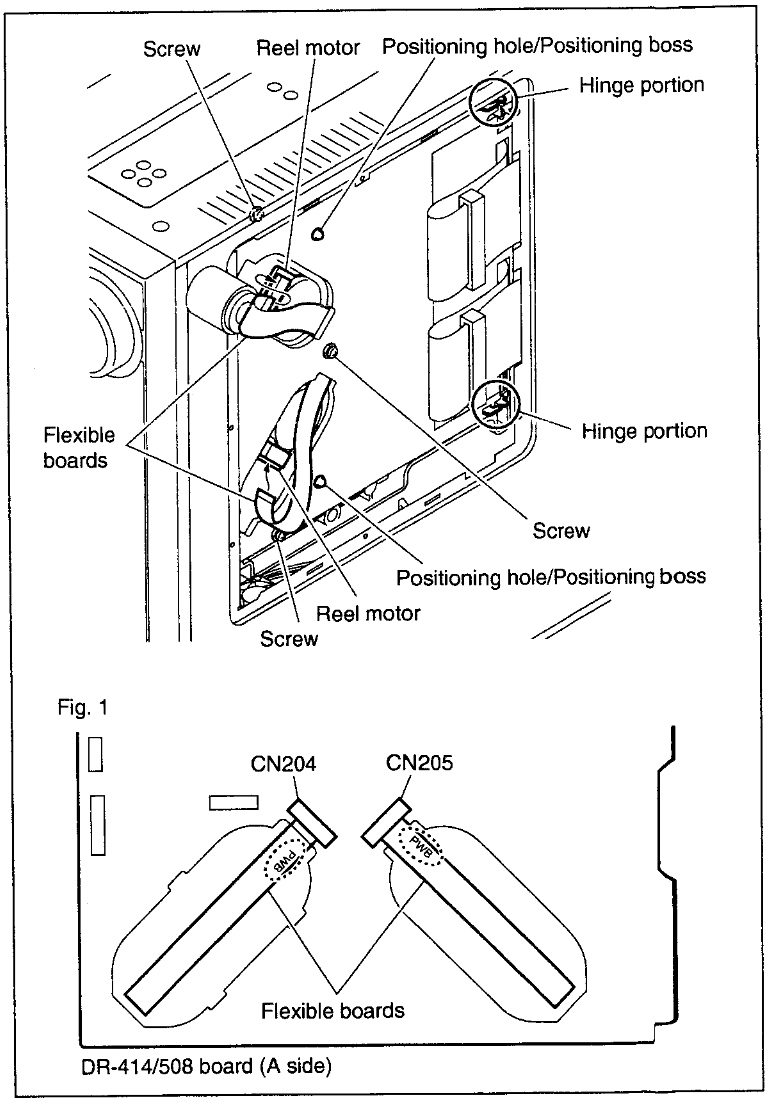
(4) Reconnect the flexible boards in step 2 to each connector on the reel motors.

CAUTION

The connecting direction of the flexible board is specified. When disconnecting the flexible boards from both reel motor and DR-414/508 board, be sure to connect them so that the character "PWB" on the flexible boards are shown at the connector sides of the DR-414/508 board. (Fig. 1.) If opposite side is connected, the DR-414/508 board will fail.

(5) Reattach the bottom plate.
(Refer to Section 1-3-2.)

(6) Restore the unit to the original position.


Screw
Reel motor
Positioning hole/Positioning boss
Hinge portion
Flexible boards
Hinge portion
Screw
Positioning hole/Positioning boss
Reel motor
Screw
Fig. 1
CN204
CN205
PWB
PWB
Flexible boards
DR-414/508 board (A side)

Closing the DR-414/508 Board

6. Cleaning

Clean the capstan motor shaft with a cleaning cloth moistened with cleaning fluid.
(Refer to Section 4-2-6.)

Note

After cleaning, wipe with a dry cleaning cloth.

7. Reattaching the W Cleaner Assembly

Reattach the W cleaner assembly.
(Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

8. Confirming the Pinch Press Clearance

Refer to step 5 in Section 5-10.

9. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

10. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

11. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

12. Confirming the Capstan Motor Operation

Refer to Section 3-2-2.
(C014: CAPSTAN)

13. Performing the Servo Adjustment

Refer to Section 3-3-2.
(A000: A001-A00A ADJUST)

5-12. Reel Table Assembly Replacement

Outline

Replacement

1. Removing the Reel Table Assembly
2. Attaching the Reel Table Assembly

Adjustment after Replacement

3. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
4. Confirming the Tape Running (Refer to Section 6-7.)

Note

How to replace the reel table assembly is the same on the supply and take-up sides.

Tools

• L-shaped wrench (1.5 mm):	7-700-736-05
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's hexagonal bit (d = 2.5 mm, l = 120 mm):	J-6251-090-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

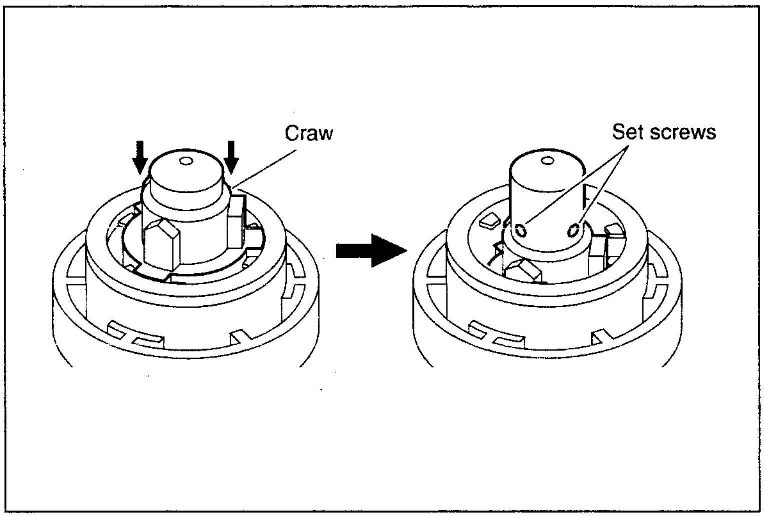
1. Removing the Reel Table Assembly

(1) Press down the claws of reel table assembly and loosen the two set screws.

(2) Remove the reel table assembly.

Note

When the reel table assembly is removed, a poly-slider washer for reel table height adjustment may adhere to it.
Be sure to check if the poly-slider washer exists or not before returning it to the reel motor shaft.
If the poly-slider washer is lost, the height of the reel table can not be met the specification and that will cause the abnormal tape running.



Set Screws of the Reel Table Assembly

Installation

2. Attaching the Reel Table Assembly

(1) Clean the perimeter of the reel table assembly with a cleaning cloth moistened with cleaning fluid.

(2) Confirm that the number of the poly-slider washers inserted in the reel motor shaft is the same as in the removal.

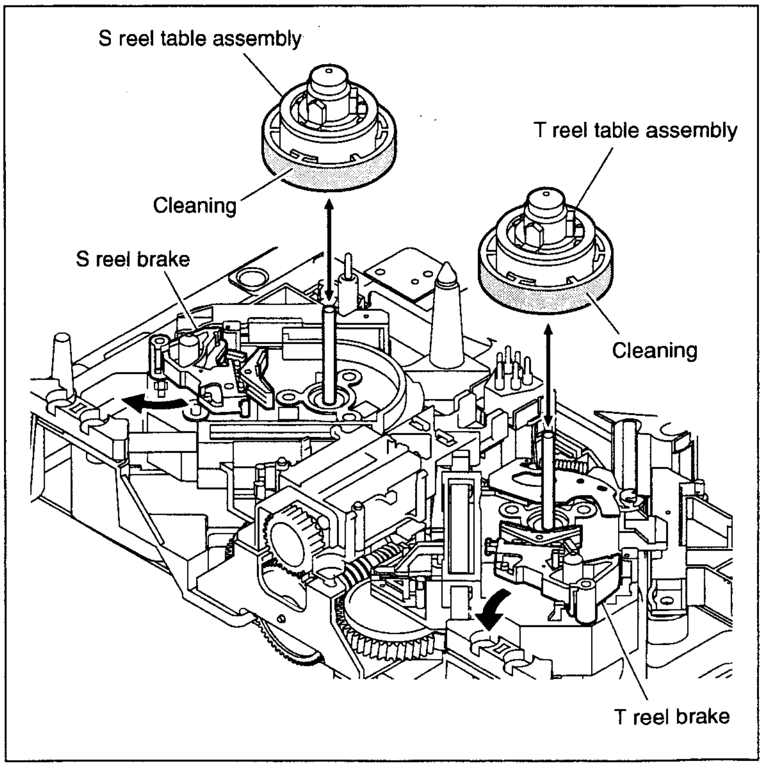
Note

When the poly-slider washer is lost, insert the following number of poly-slider washers into the reel motor shaft.

S-reel: Poly-slider washer (t = 0.13 mm) ×1
Sony part No. : 3-701-441-01
Poly-slider washer (t = 0.25 mm) ×1
Sony part No. : 3-701-441-11
T-reel: Poly-slider washer (t = 0.13 mm) ×1
Sony part No. : 3-701-441-01

(3) Release the reel brake in the arrow direction and pass the reel table assembly through the reel motor shaft.

(4) Press down the claws and tighten the two set screws.
Tightening torque: 58.8×10^{-2} N•m
{6.0 kgf•cm}



Remove/Attach the Reel Table Assembly

Adjustment after Replacement

3. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

4. Confirming the Tape Running

Refer to Section 6-7.

5-13. Brake Lining Replacement

Outline

Replacement

1. Removing the Brake Assembly
2. Attaching the Brake Assembly

Adjustment after Replacement

3. Reel brake clearance check

Note

- When the brake lining is worn, replace the whole brake assembly.
- How to replace the brake assembly is the same on the supply and take-up sides.

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Brake Assembly

(1) Unhook the spring put on the reel motor assembly.

(2) Release the claw by pressing in the arrow direction, then remove the brake assembly.

Installation

2. Attaching the Brake Assembly

(1) Pass a new brake assembly through the shaft of the reel motor assembly and fix it with the claw.

(2) Hook the spring to the reel motor assembly.

Adjustment after Replacement

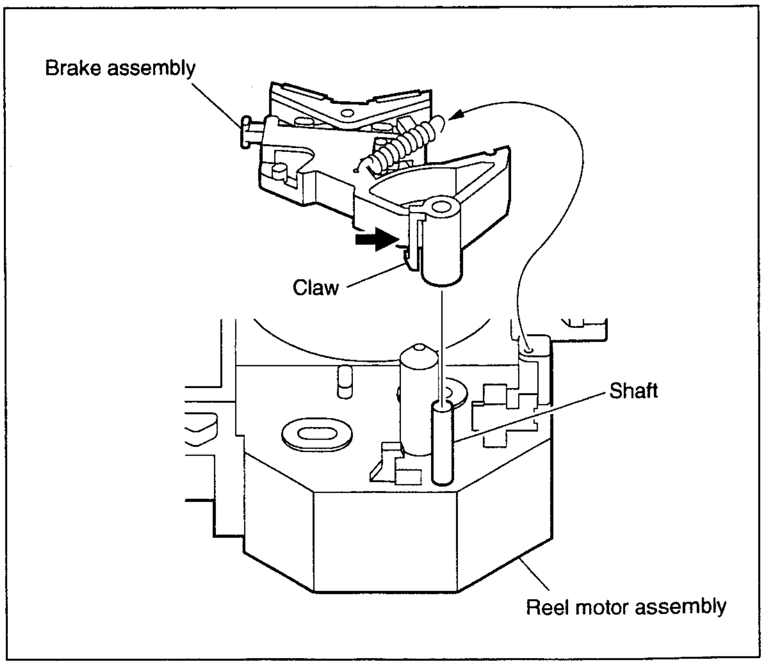
3. Reel brake clearance check

Note

Perform this check while the cassette compartment is removed.

(1) Turn on the power.

(2) While the reel table is rotating, check that the brake lining does not contact with the reel table at the reel tables of S and T sides.



Remove/Attach the Brake Lining

5-14. Reel Motor Assembly Replacement

Outline

Replacement

1. Removing the SE-606 Board (HDW series, DVW series, MSW-M only)
2. Removing the ME Wire (T-side only)
3. Removing the Shaft Holder
4. Remove the Reel Motor Assembly
5. Reconnecting the Flexible Board
6. Inserting the Slide Shaft
7. Attaching the Reel Motor Assembly
8. Attaching the ME Wire (T-side only)
9. Reattaching the Shaft Holder
10. Applying Grease to the Slide Shaft
11. Attaching the SE-606 Board (HDW series, DVW series, MSW-M only)

Adjustment after Replacement

12. Confirming the Reel Motor Operation (Refer to Section 3-2-2.)
    (C010 : S REEL, C011 : T REEL)
13. Performing the Servo Adjustment (Refer to Section 3-3-2.)
    (A000 : A001-A00A ADJUST)
14. Adjusting the Tape Running
    MSW Recorder ⇨ Refer to Section 6-2.
    MSW Player ⇨ Refer to Section 6-3.
    HDW Recorder ⇨ Refer to Section 6-4.
    HDW Player ⇨ Refer to Section 6-5.
    DVW Recorder ⇨ Refer to Section 6-6.
15. Confirming the Tape Running (Refer to Section 6-7.)

Note

- In this unit, it is not necessary to perform the traditional reel motor shaft slantness adjustment after the reel motor assembly replacement.
- When replacing the reel motor, be sure to perform the replacement as the reel motor assembly. Never replace the single reel motor.
- The parts making up the reel motor assembly is different between S side and T side. However, how to replace the reel motor assembly is the same for both sides.

Tools

• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A
• Grease (SGL-601):	7-651-000-10
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01

Preparation

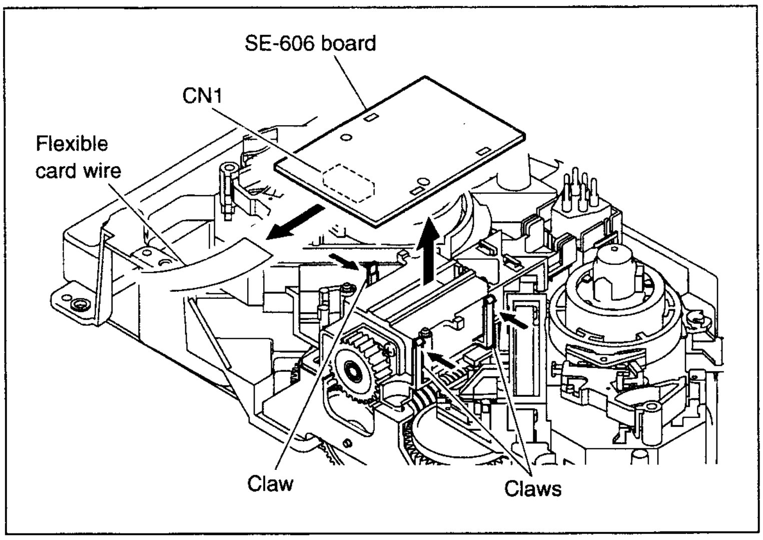
1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the SE-606 Board

(1) Press the three claws in the arrow derections to remove the SE-606 board.

(2) Disconnect the flexible card wire from the connector CN1 on the SE-606 board.


SE-606 board
CN1
Flexible card wire
Claw
Claws

Remove the SE-606 Board

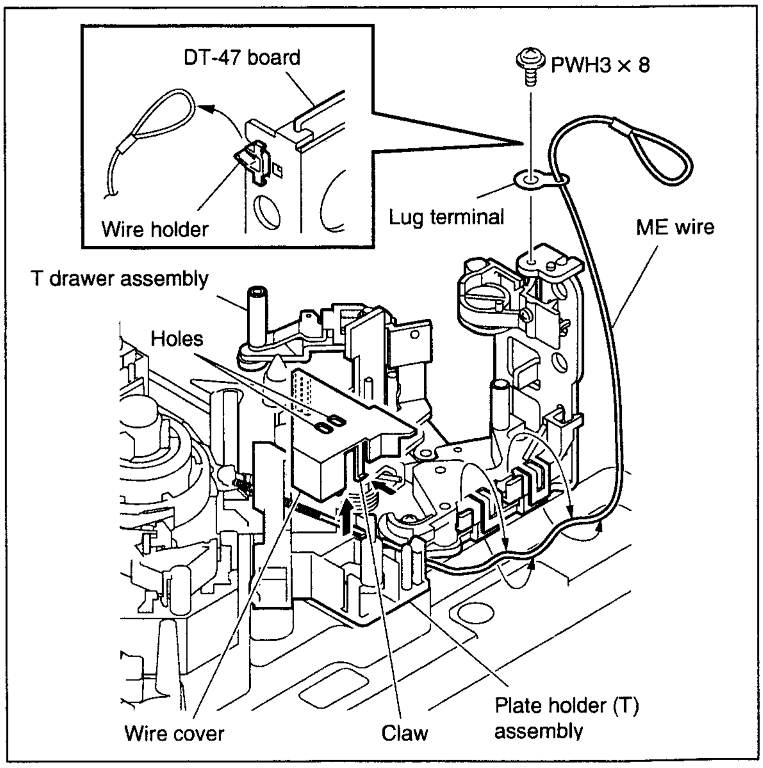
2. Removing the ME Wire (T-side only)

(1) Remove the ME wire from the wire holder.

(2) Remove the screw securing the lug terminal of the ME wire.

(3) Grasp the hole of the wire cover with a pair of pliers, press the claw on the cover in the arrow direction, and remove the wire cover from the plate holder (T) assembly.

(4) Remove the ME wire from the T drawer assembly as shown in the figure.


DT-47 board
Wire holder
PWH3 × 8
Lug terminal
ME wire
T drawer assembly
Holes
Wire cover
Claw
Plate holder (T) assembly

Remove the ME Wire

3. Removing the Shaft Holder

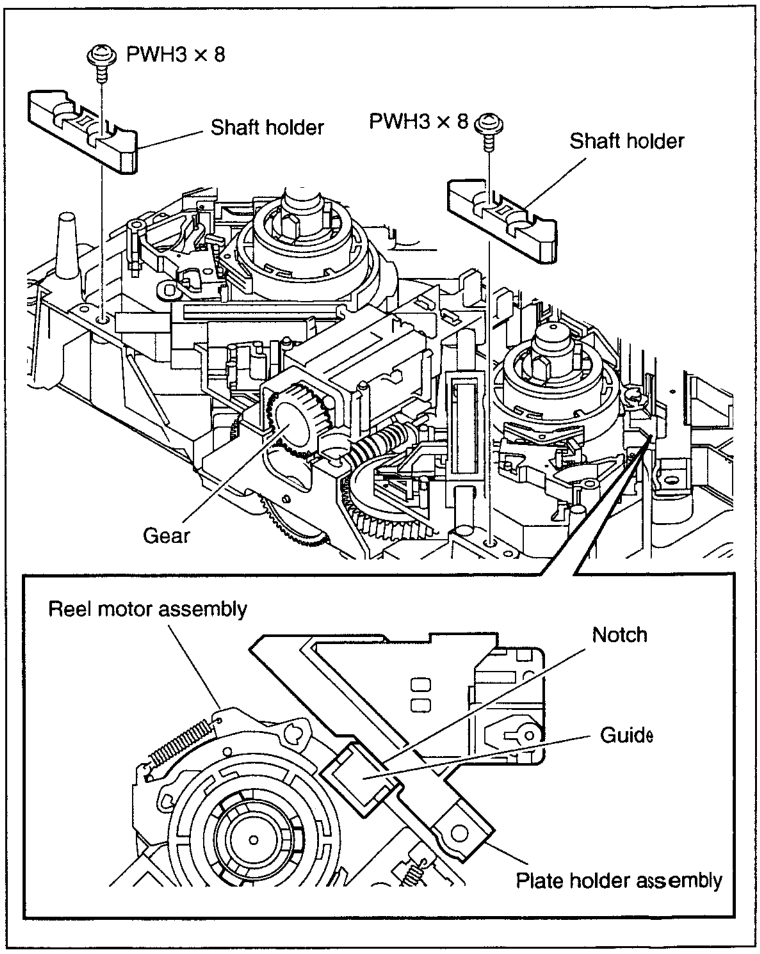
(1) Shift the reel motor assembly by turning the gear of reel shift motor.

(2) Align the guide portion of the reel motor assembly with the notch of the plate holder assembly.

Note

The reel motor assembly cannot be removed in the S or T cassette position.

(3) Remove the screw to remove the shaft holder.


PWH3 x 8
Shaft holder
PWH3 x 8
Shaft holder
Gear
Reel motor assembly
Notch
Guide
Plate holder assembly

Remove the Shaft Holder

4. Removing the Reel Motor Assembly

(1) Pull the slide shaft toward the front panel and take it off the motor holder assembly.
(2) Slide the reel motor assembly to the arrow Ⓐ so that the guide portion is removed from the plate holder assembly.
(3) Lift straight up the reel motor assembly.
(4) Disconnect the flexible board from the connector of the reel motor.
(5) Pull out the slide shaft from the reel motor assembly.
(6) Wipe off grease remained on the surface of the slide shaft with a cloth.

CAUTION

- Be careful not to adhere grease seared the slide shaft to another parts.
- Be careful not to cause damage to the slide shaft during removal.

Installation

5. Reconnecting the Flexible Board

(1) Clean the edge of the flexible board with a dry cloth.
(2) Connect the flexible board to a reel motor connector of a new reel motor assembly.

CAUTION

The connecting direction of the flexible board is specified. When disconnecting the flexible boards from both reel motor and DR-414/508 board, be sure to connect them so that the character "PWB" on the flexible boards are shown at the connector sides of the DR-414/508 board. (Fig. 1.) If opposite side is connected, it causes damage to the DR-414/508 board.

6. Inserting the Slide Shaft

Insert the slide shaft removed in step 4 in the hole of the reel motor assembly.

7. Attaching the Reel Motor Assembly

(1) Keeping the both states that the guide portion of the reel motor assembly is aligned with the notch of the plate holder assembly and the pin of drive gear assembly will be able to be insert between the limiter arms, install the RS table block assembly.
(2) Pass the ME wire and the lug terminal through the plate holder (T) assembly.
(3) Insert the slide shaft in the motor holder assembly.

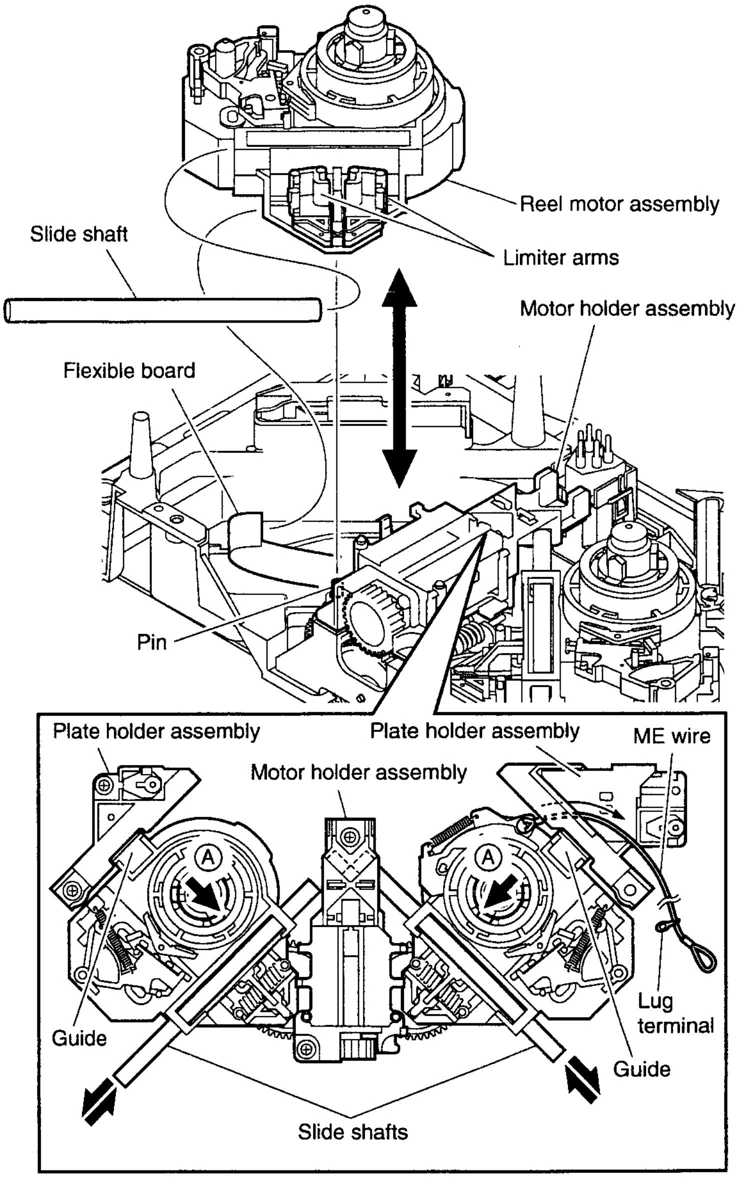
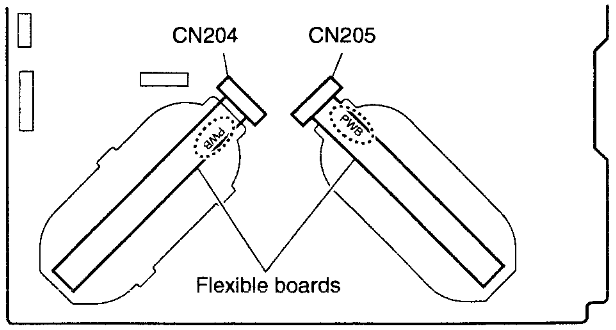

Reel motor assembly
Slide shaft
Limiter arms
Motor holder assembly
Flexible board
Pin
Plate holder assembly
Plate holder assembly
ME wire
Motor holder assembly
Ⓐ
Ⓐ
Lug terminal
Guide
Guide
Slide shafts

Fig. 1


CN204
CN205
PWB
PWB
Flexible boards

DR-414/508 board (A side)

Remove/Attach the Reel Motor Assembly

8. Reattaching the Shaft Holder

(1) Match the boss of the shaft holder to the hole of the MD base assembly.

(2) Pressing the shaft holder to the arrow direction, tighten it with one screw for each.

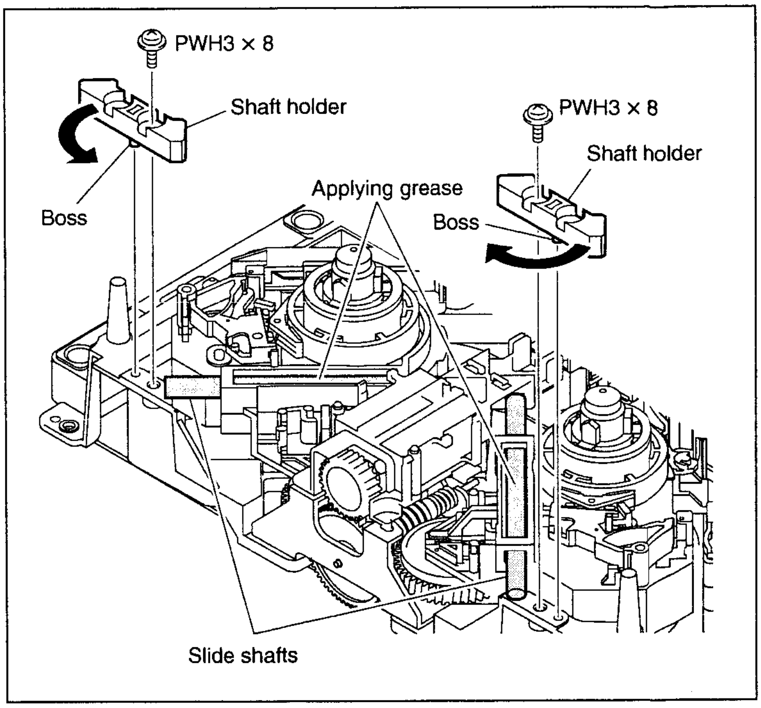
9. Applying Grease on the Slide Shaft

(1) Apply a very small portion of grease on the slide shaft and spread grease over the whole shaft.

Note

Use care not to put grease on other parts in vicinity.

(2) Confirm that the reel motor assembly moves smoothly when bringing to the S cassette position and L cassette position.
(As for the method of shifting the reel motor assembly, refer to Section 5-1-3.)


PWH3 x 8
Shaft holder
PWH3 x 8
Shaft holder
Applying grease
Boss
Boss
Slide shafts

Reattach the Shaft Holder and Apply Grease

10. Attaching the ME Wire (T-side only)

(1) Hook the ME wire in the T drawer assembly as shown in the figure and fix the lug terminal with the screw.

(2) Set the reel motor assembly to the S cassette position. (Refer to Section 5-1-3.)
Next, mount the wire cover to the plate holder (T) assembly from the top, and secure with the claw of the wire cover.

Note

Make sure the ME wire does not protrude out of the wall of the wire cover. (See the figure.)

(3) Confirm that the ME wire moves smoothly and the reel table rotates when the tip of the ME wire is drawn. (Refer to (1) and (2) of step 5 in Section 5-23.)

(4) Hang the tip of the ME wire on the wire holder and close the wire holder.

11. Reattaching the SE-606 Board

Reattach the SE-606 board in the reverse order of step 1.

Adjustment after Replacement

12. Confirming the Reel Motor Operation

Refer to Section 3-2-2.
(C010 : S REEL, C011 : T REEL)

13. Performing Servo Adjustment

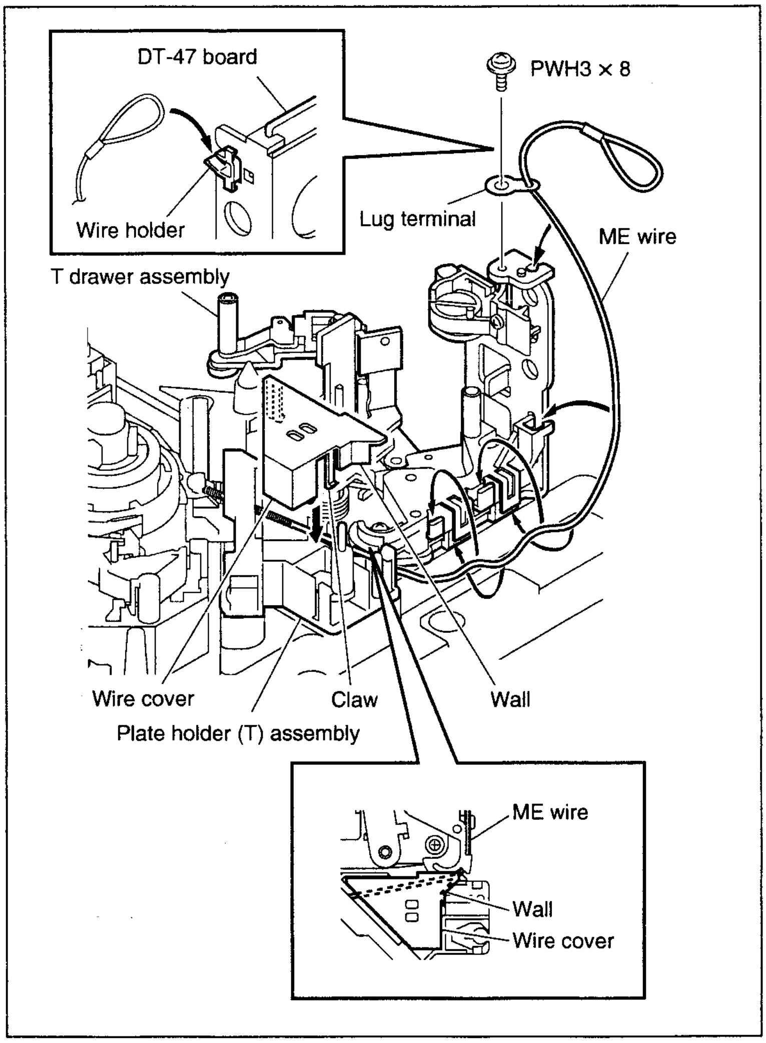
Refer to Section 3-3-2.
(A000 : A001-A00A ADJUST)

14. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

15. Confirming the Tape Running

Refer to Section 6-7.


DT-47 board
PWH3 x 8
Wire holder
Lug terminal
ME wire
T drawer assembly
Wire cover
Claw
Wall
Plate holder (T) assembly
ME wire
Wall
Wire cover

Attach the ME Wire

5-15. Reel Shift Motor Replacement

When a reel shift motor needs replacing, replace the whole motor holder assembly.

Outline

Replacement

1. Removing the Reel Motor Assembly (Refer to steps 1 through 4 in Section 5-14.)
2. Removing the Motor Holder Assembly
3. Attaching the Motor Holder Assembly
4. Reattaching the Reel Motor Assembly (Refer to steps 5 through 11 in Section 5-14.)

Adjustment after Replacement

5. Confirming the Reel Shift Motor Operation

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Reel Motor Assembly

Remove the reel motor assembly.
(Refer to steps 1 through 4 in Section 5-14.)

2. Removing the Motor Holder Assembly

(1) Remove the two screws and shift the MC sensor assembly in the arrow direction.
(2) Disconnect the harness from the connector CN2 of the MC sensor assembly.
(3) Remove the two screws fixing the motor holder assembly.
(4) Remove the hook from the slotted hole to remove the motor holder assembly.

Installation

3. Attaching the Motor Holder Assembly

(1) Insert the hook of a new motor holder assembly to the slotted hole of the worm assembly.
(2) Shift the motor holder assembly to the arrow direction so that the hook is inserted in the slotted hole.
(3) Fix the motor holder assembly with two screws in the state of step (2).
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}
(4) Connect the harness of the motor holder assembly to the connector CN2 of the MC sensor assembly and route the harness as shown in the figure.

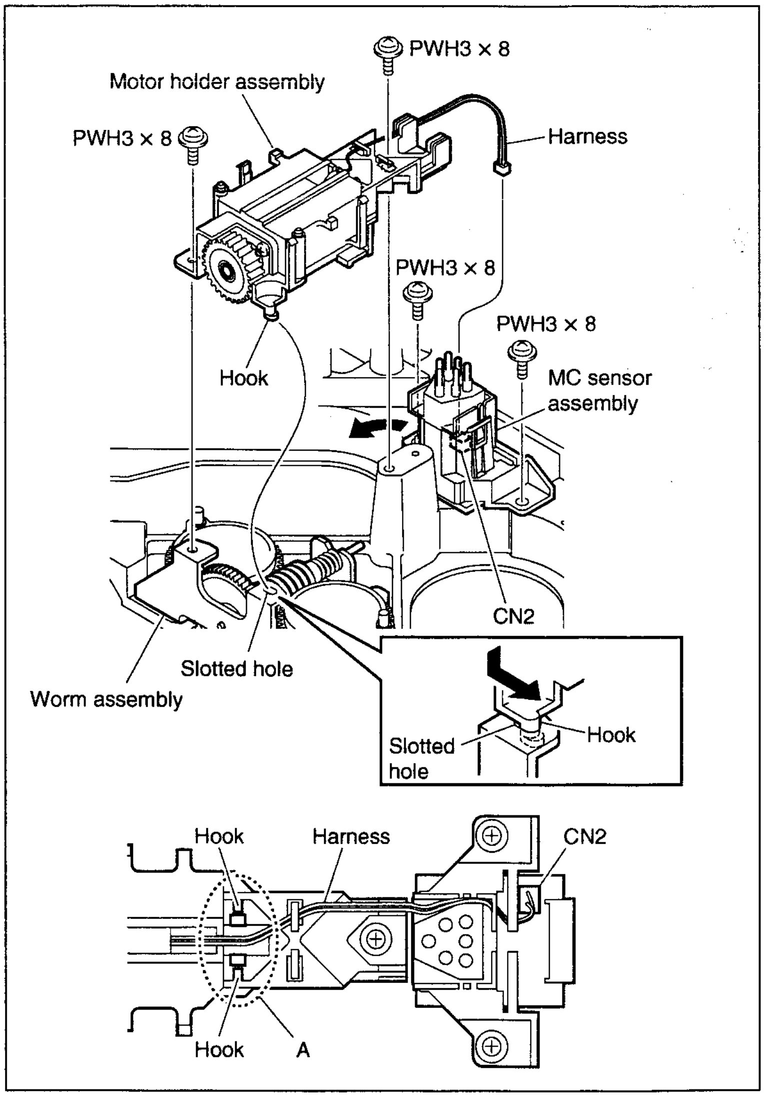
Note

Arrange the too long harness with claws so that it will not contact with the driving section of the reel motor assembly, etc.

(5) Fix the MC sensor assembly with the two screws.

4. Reattaching the Reel Motor Assembly

Reattach the reel motor assembly.
(Refer to steps 5 through 11 in Section 5-14.)



Remove/Attach the Motor Holder Assembly

Adjustment after replacement

5. Confirming the Reel Shift Motor Operation

(1) Turn the power on.
(2) Press the switch S300 on the SS-89 board and check if the reel shift motor operates smoothly. (Refer to Section 5-1-3.)

5-16. Reel Shift Gear Replacement

When replacing the reel shift gear, replace the drive gear (S) assembly, drive gear (T) assembly and the worm assembly.

Outline

Replacement

1. Removing the Reel Motor Assemblies (Refer to steps 1 through 4 in Section 5-14.)
2. Removing the Motor Holder Assembly (Refer to step 2 in Section 5-15.)
3. Removing the Drive Gear Assemblies
4. Removing the Worm Assembly
5. Attaching the Worm Assembly
6. Attaching the Drive Gear Assemblies
7. Reattaching the Motor Holder Assembly (Refer to step 3 in Section 5-15.)
8. Reattaching the Reel Motor Assemblies (Refer to steps 5 through 11 in Section 5-14.)

Adjustment after Replacement

9. Confirming the Reel Shift Motor Operation

Note

When replacing the drive gear (S) assembly, drive gear (T) assembly and the worm assembly, prepare a new stop washer.
Stop washer: 3-650-537-01

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Reel Motor Plate Assembly

Remove the reel motor assembly.
(Refer to steps 1 through 4 in Section 5-14.)

2. Removing the Motor Holder Assembly

Remove the motor holder assembly.
(Refer to step 2 in Section 5-15.)

3. Removing the Drive Gear Assemblies

Remove the each stop washer to remove the driving gear (S) assembly and driving gear (T) assemblies.

4. Removing the Worm Assembly

Remove the two screws to remove the worm assembly.

Installation

5. Attaching the Worm Assembly

(1) Wipe off grease from a new worm assembly and clean it.
(2) Apply grease on the worm gear of the worm assembly.
(3) Align the positioning hole of the worm assembly with the positioning pin of the MD base assembly and fix it with the two screws.
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

6. Attaching the Drive Gear Assemblies

(1) Pass the driving gear (S) and (T) assemblies on the shafts of the MD base assembly respectively.
(2) Re-engage the marked portions gear of both driving gear (S) and (T) assemblies with the same groove of the worm gear.
(3) Fix the driving gear (S) and (T) assemblies with a new stop washer.

7. Reattaching the Motor Holder Assembly

Reattach the motor holder assembly.
(Refer to step 3 in Section 5-15.)

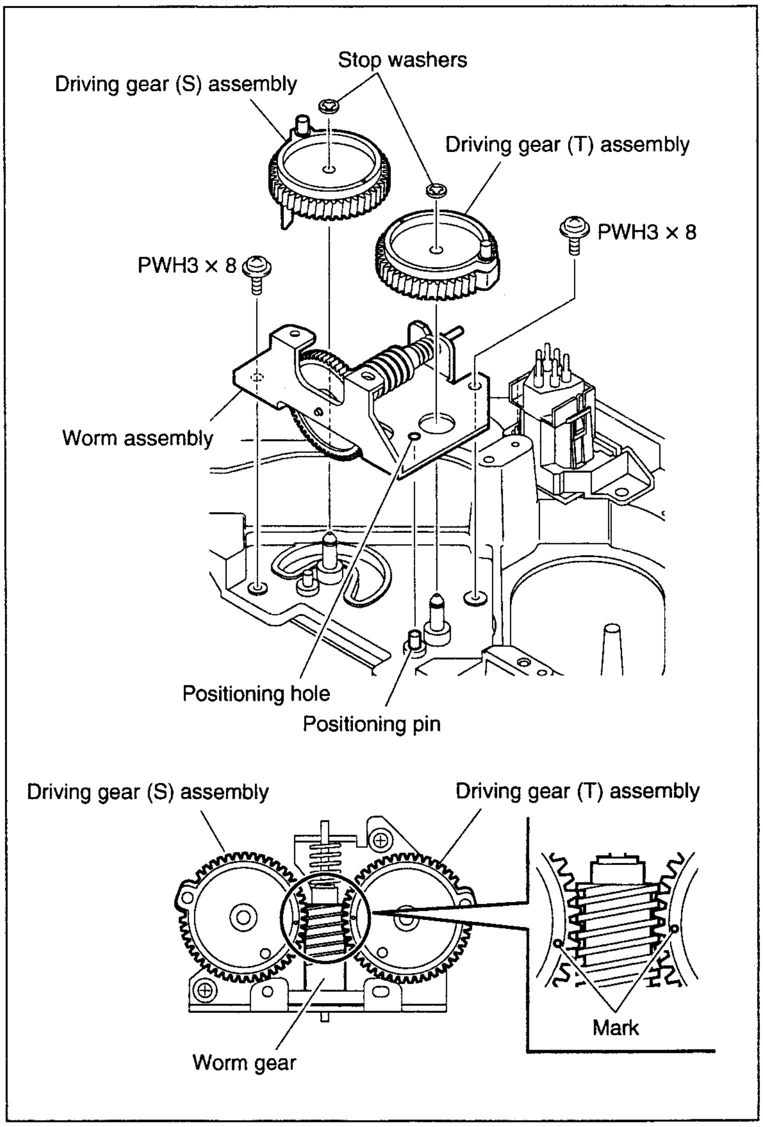
8. Reattaching the Reel Motor Assemblies

Reattach the reel motor assemblies.
(Refer to steps 5 through 11 in Section 5-14.)

Adjustment after Replacement

9. Confirming the Reel Shift Motor Operation

(1) Turn the power on.
(2) Press the switch S300 on the SS-89 board and check if the reel shift motor operates smoothly. (Refer to Section 5-1-3.)


Stop washers
Driving gear (S) assembly
Driving gear (T) assembly
PWH3 x 8
PWH3 x 8
Worm assembly
Positioning hole
Positioning pin
Driving gear (S) assembly
Driving gear (T) assembly
Mark
Worm gear

Remove/Attach the Drive Gear Assemblies

5-17. Tape Guide Replacement

Replace the each tape guide with the unit of parts shown in the following List of Tape Guide.

Note

When replacing the tape guide, use extreme care no to damage the drum.

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

List of Tape Guide

Name	Parts to be replaced	Method	Adjustment after replacement
TG-0	S plate assembly	Refer to Section 5-17-1.	Refer to "Adjustment after Replacement" in Section 5-17-1.
TG-1	S tension regulator assembly	Refer to Section 5-21.	Refer to "Adjustment after Replacement" in Section 5-21.
TG-2	TG-2 assembly	Refer to the Exploded views.	MSW Recorder ⇨ Refer to Section 6-2. MSW Player ⇨ Refer to Section 6-3. HDW Recorder ⇨ Refer to Section 6-4. HDW Player ⇨ Refer to Section 6-5. DVW Recorder ⇨ Refer to Section 6-6. Refer to "6-7. Tape Running Check and Adjustment"
TG-3	TG-3 assembly	Refer to the Exploded views.	
TG-4	TG-4 assembly	Refer to the Exploded views.	
TG-5	Ring assembly	Refer to Section 5-20.	Refer to "Adjustment after Replacement" in Section 5-20.
TG-6	Pinch arm assembly	Refer to Section 5-9.	Refer to "Adjustment after Replacement" in Section 5-9.
TG-7	Ring assembly	Refer to Section 5-20.	Refer to "Adjustment after Replacement" in Section 5-20.
TG-8	T tension regulator assembly	Refer to Section 5-22.	Refer to "Adjustment after Replacement" in Section 5-22.
TG-9	Ring assembly	Refer to Section 5-20.	Refer to "Adjustment after Replacement" in Section 5-20.
TG-10	T drawer assembly	Refer to Section 5-23.	Refer to "Adjustment after Replacement" in Section 5-23.
Slant guide			

For the exploded views, refer to the maintenance manual volume 2.

5-17-1. S Plate Assembly Replacement

Note

Two types of the S plate assembly have been used: new type and former type. This section describes the replacement procedure respectively.

Outline

Replacement

1. Removing the S Plate Assembly
2. Attaching the S Plate Assembly

Adjustment after Replacement

3. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
4. Confirming the Tape Running (Refer to Section 6-7.)

Tools

• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal of New Type

1. Removing the S Plate Assembly (New Type)

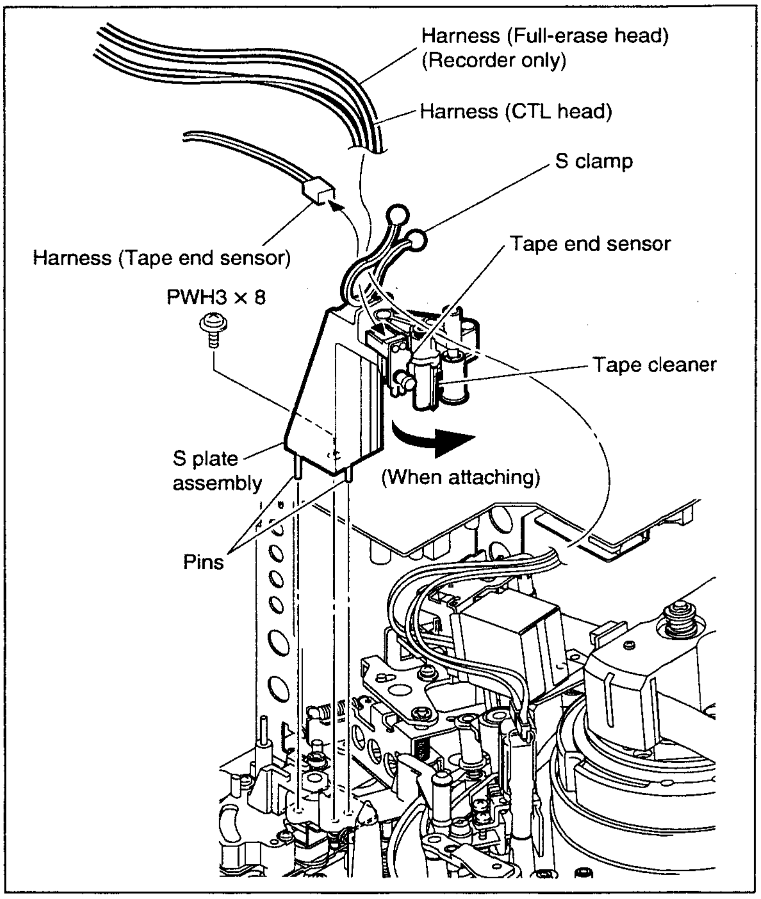
(1) Disconnect the harness from the connector of the tape end sensor.

(2) Disconnect all the harnesses from the sensor holder. (Five for recorder, four for player)

(3) Remove the screw to remove the S plate assembly.

CAUTION

Be very careful of the sharp edge of the tape cleaner.


Harness (Full-erase head)
(Recorder only)
Harness (CTL head)
S clamp
Tape end sensor
Harness (Tape end sensor)
PWH3 × 8
Tape cleaner
S plate assembly
(When attaching)
Pins

Remove/Attach the S Plate Assembly (New Type)

Installation of New Type

2. Attaching the S Plate Assembly (New Type)

(1) Insert the pins of the S plate assembly into the holes of the chassis and tighten the screw while drawing the assembly counterclockwise.

Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

CAUTION

Be very careful of the sharp edge of the tape cleaner.

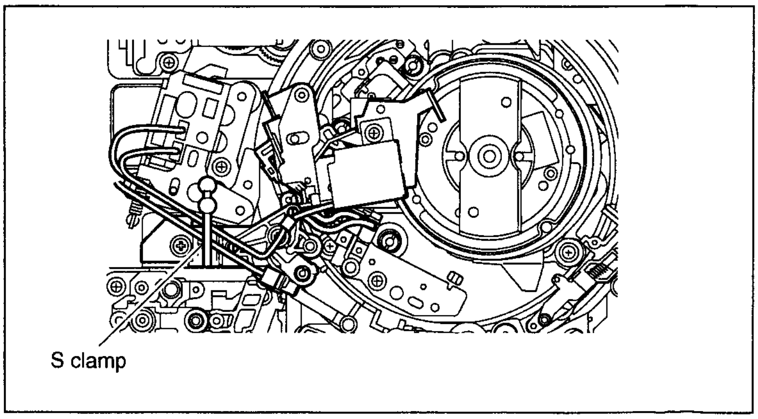
(2) Connect the harness (tape end sensor) to the connector of the tape end sensor and clamp it with the S clamp.

(3) **For recorder only**

Clamp the harness (full-erase head) with the S clamp.

(4) Clamp the harness (CTL head) with the S clamp.

(5) Clamp the two harnesses of the W cleaner assembly with the S clamp.



Clamp the Harnesses (New Type)

Adjustment after Replacement

3. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

4. Confirming the Tape Running

Refer to Section 6-7.

Removal of Former Type

1. Removing the S Plate Assembly (Former Type)

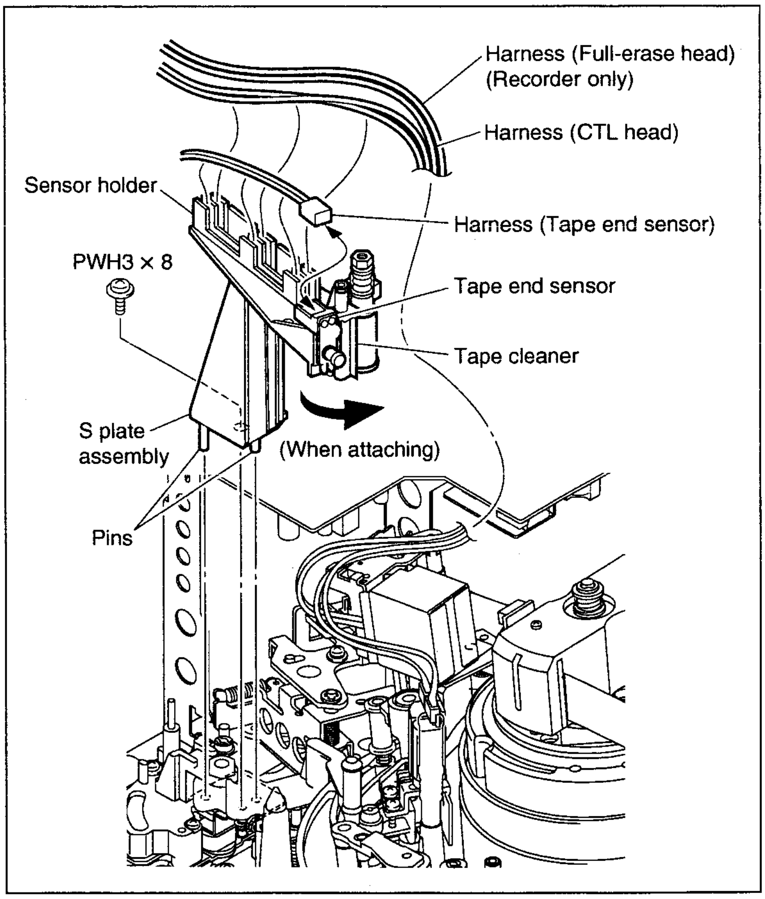
(1) Disconnect the harness from the connector of the tape end sensor.

(2) Disconnect all the harnesses from the sensor holder. (Five for recorder, four for player)

(3) Remove the screw to remove the S plate assembly.

CAUTION

Be very careful of the sharp edge of the tape cleaner.


Harness (Full-erase head)
(Recorder only)
Harness (CTL head)
Sensor holder
Harness (Tape end sensor)
PWH3 x 8
Tape end sensor
Tape cleaner
S plate assembly
(When attaching)
Pins

Remove/Attach the S Plate Assembly (Former Type)

Installation of Former Type

2. Attaching the S Plate Assembly (Former TYpe)

(1) Insert the pins of the S plate assembly into the holes of the chassis and tighten the screw while drawing the assembly clockwise.
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

CAUTION

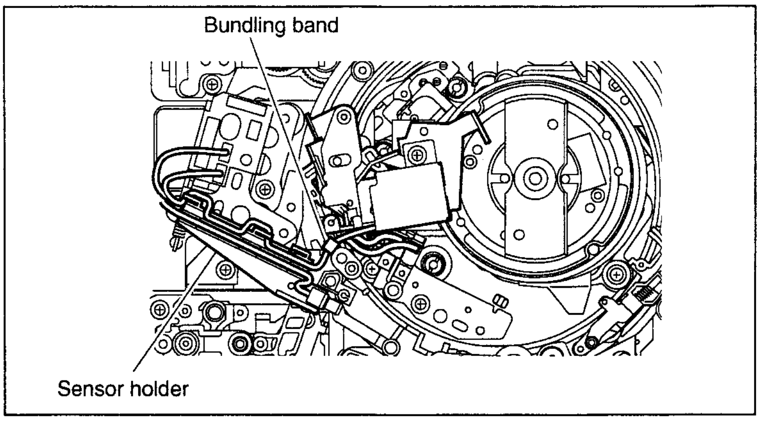
As the edge of tape cleaner is sharp, use great care to avoid a hand cut.

(2) Connect the harness (tape end sensor) to the connector of the tape end sensor and fix it to the sensor holder.

(3) **For recorder only**
Fix the harness (full-erase head) to the sensor holder.

(4) Fix the harness (CTL head) to the sensor holder.

(5) Fix the two harnesses of the W cleaner assembly to the sensor holder.



Fix the Harnesses (Former Type)

Adjustment after Replacement

3. Adjusting the Tape Running

MSW Recorder ⇨ Refer to Section 6-2.
MSW Player ⇨ Refer to Section 6-3.
HDW Recorder ⇨ Refer to Section 6-4.
HDW Player ⇨ Refer to Section 6-5.
DVW Recorder ⇨ Refer to Section 6-6.

4. Confirming the Tape Running

Refer to Section 6-7.

5-18. Tape Cleaner Replacement

CAUTION

Do not touch the tape cleaner with bare hands.
The tape cleaner has a sharp edge, which may cause a hand cut.

Notes

- The tape cleaner that is attached to the new type of the S plate assembly (Refer to Section 5-17-1) is not replaceable. When the tape cleaner has to be replaced, replace the S plate assembly. (Refer to Section 5-17-1.)
- The tape cleaner that is attached to the former type of the S plate assembly (Refer to Section 5-17-1) is replaceable. Replace the tape cleaner as described below.

Note

Adjustment after the tape cleaner replacement is not required.

Tools

• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the Tape Cleaner

Remove the screw, then remove the tape cleaner from the S plate assembly.

Installation

2. Attaching the Tape Cleaner

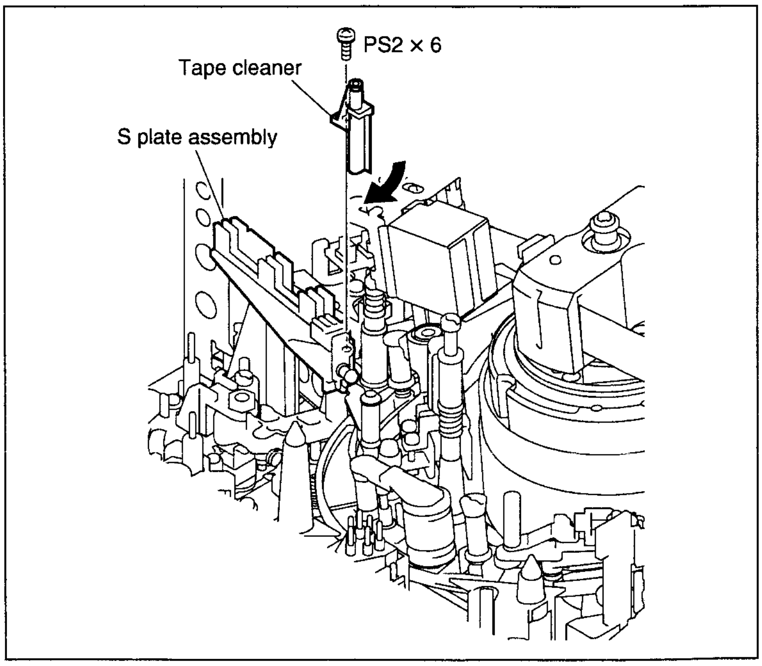
Tighten the screw while moving a new tape cleaner clockwise.

Tightening torque: 19.6×10^{-2} N•m {2 kgf•cm}

Check after Replacement

3. Confirming the Tape Running

Refer to Section 6-7.



Remove/Attach the Tape Cleaner

5-19. Gear Box Assembly Replacement

Outline

Replacement

1. Removing the W Cleaner Assembly (Refer to steps 1 and 2 in Section 5-5.)
2. Shifting the TG-9
3. Disconnecting the Harness (CN233/HN-268 Board)
4. Removing the Gear Box Assembly
5. Attaching the Gear Box Assembly
6. Reconnecting the Harness (CN233/HN-268 Board)
7. Reattaching the W Cleaner Assembly (Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

8. Confirming the Threading Motor Operation (C012: THREADING)
   (Refer to Section 3-2-2.)

Tools

• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)
4. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

Removal

1. Removing the W cleaner assembly

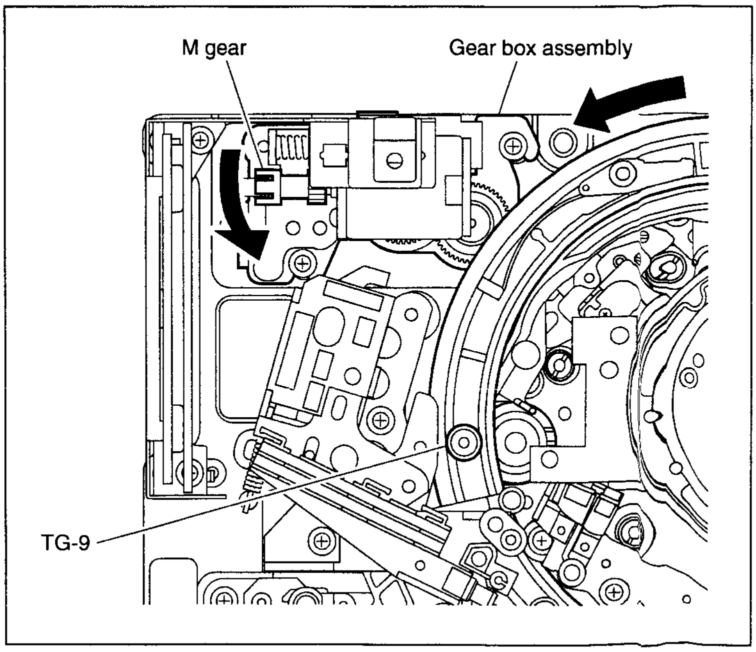
(Refer to steps 1 and 2 in Section 5-5.)

2. Shifting the TG-9

Turn the M gear of the gear box assembly in the arrow direction to shift the TG-9 to the position as shown in the figure.

Note

Move the TG-9 so that enough space to remove the gear box assembly is made.



Shifting the TG-9

3. Disconnecting the Harness

Disconnect the harness from the connectors CN233 and CN920 of the gearbox assembly.

4. Removing the Gearbox Assembly

(1) Remove the two screws.
(2) While lifting up the threading ring assembly to the arrow A direction, move the gearbox assembly to the arrow B direction to remove the positioning bosses (A) and (B) from the MD base assembly.
(3) Remove the gearbox assembly while paying attention not to contact with the capstan, AT head, and TG-4.

Installation

5. Attaching the Gearbox Assembly

(1) Lift the threading ring assembly then Insert the projection (A) of the gear box assembly in the positioning hole (A) of the MD base assembly.
(2) Press the gearbox assembly from above with fingers and confirm that the positioning bosses (A) and (B) are inserted into the positioning holes (A) and (B) of the MD base assembly. (The gear box assembly should make no rattles when pressed with fingers.)
(3) Fix the gear box assembly with the two screws.
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

6. Reconnecting the Harness

Reconnect the harness to the connectors CN233 and CN920 of the gearbox assembly.

Note

Avoid contacting the harness to the drive portion of the gear box assembly.

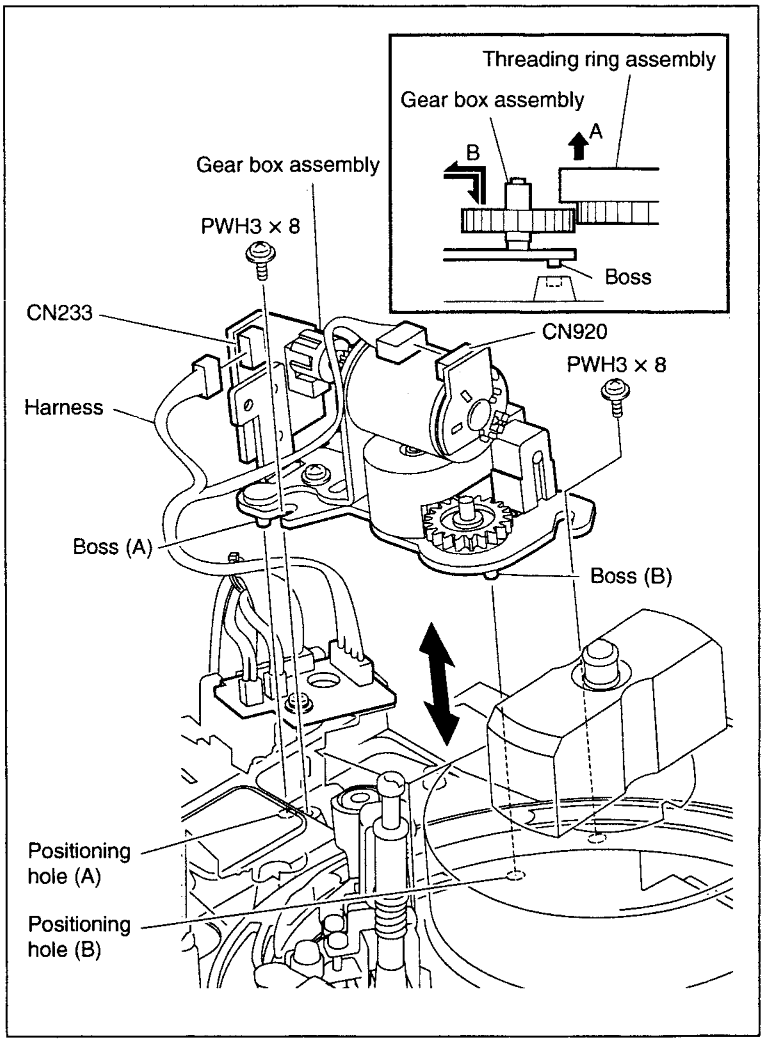
7. Reattaching the W Cleaner Assembly

Reattach the W cleaner assembly.
(Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

8. Confirming the Threading Motor Operation

Refer to Section 3-2-2.
(C012: THREADING)



Remove/Attach the Gear Box Assembly

5-20. Threading Ring Assembly Replacement

Outline

Replacement

1. Removing the W Cleaner Assembly (Refer to steps 1 and 2 in Section 5-5.)
2. Disconnecting the Flexible Board (CN220/DT-47 board)
3. Disconnecting the Harnesses (AT head, full-erase head, CTL head)
4. Removing the PA Guard
5. Removing the CL Guide Rail
6. Removing the Pinch Press Assembly (Refer to steps 1 and 2 in Section 5-10.)
7. Removing the S Plate Assembly (Refer to steps 1 in Section 5-17-1.)
8. Removing the S Tension Regulator Assembly
   (Refer to step 1 in Section 5-21.)
9. Removing the T Drawer Assembly (Refer to steps 1 and 2 in Section 5-23.)
10. Removing the Gear Box Assembly (Refer to steps 1 through 4 in Section 5-19.)
11. Removing the Ring Roller (B)
12. Removing the Threading Ring Assembly
13. Cleaning (Threading Ring Assembly, Ring Roller)
14. Attaching the Threading Ring Assembly
15. Attaching the Ring Roller (B)
16. Confirming the Threading Ring Operation
17. Reattaching the Gear Box Assembly (Refer to steps 5 and 6 in Section 5-19.)
18. Reattaching the Pinch Press Assembly (Refer to steps 3 and 4 in Section 5-10.)
19. Putting the Unit into the Unthreading End Mode
20. Reattaching the S Tension Regulator Assembly (Refer to step 2 in Section 5-21.)
21. Reattaching the S Plate Assembly (Refer to step 2 in Section 5-17-1.)
22. Reattaching the T Drawer Assembly (Refer to steps 3 through 6 in Section 5-23.)
23. Reattaching the CL Guide Rail
24. Confirming the CL Arm Assembly Operation (Refer to step 3 in Section 5-6.)
25. Reattaching the PA Guard
26. Reconnecting the Flexible Board (CN220/DT-47 Board)
27. Reconnecting the Harness (AT head, full-erase head, CTL head)
28. Reattaching the W Cleaner Assembly (Refer to steps 4 through 6 in Section 5-5.)

Adjustment after Replacement

29. Confirming the Cleaning Solenoid Operation (C023 : CLEANING ROLLER)
    (Refer to Section 3-2-2.)
30. Performing the Tension Offset Adjustment (A00A : S/T TENSION OFFSET)
    (Refer to Section 3-3-2.)
31. Confirming the Pinch Press Clearance (Refer to step 5 in Section 5-10.)
32. Adjusting the Tape Running
    MSW Recorder ⇨ Refer to Section 6-2.
    MSW Player ⇨ Refer to Section 6-3.
    HDW Recorder ⇨ Refer to Section 6-4.
    HDW Player ⇨ Refer to Section 6-5.
    DVW Recorder ⇨ Refer to Section 6-6.
33. Confirming the Tape Running (Refer to Section 6-7.)

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the W Cleaner Assembly

Remove the W cleaner assembly.
(Refer to steps 1 and 2 in Section 5-5.)

2. Disconnecting the Flexible Board

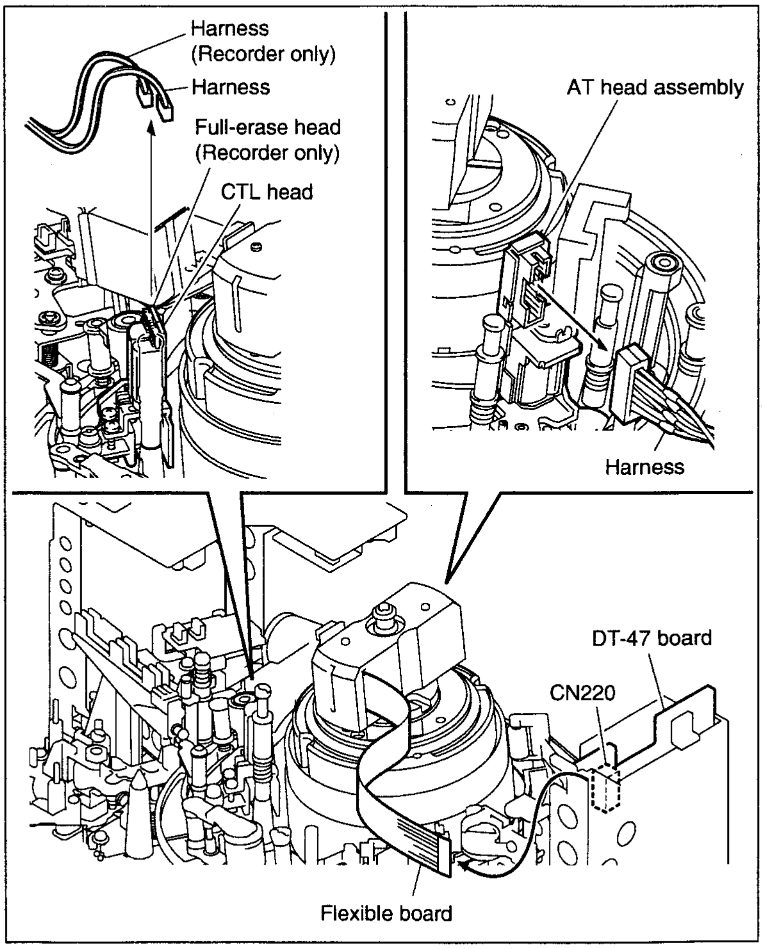
Disconnect the flexible board from the connector CN220 on the DT-47 board.

3. Disconnecting the Harnesses

(1) Disconnect the harness from the connector of the AT head Assembly.

(2) **For recoreder only**
Disconnect the harness from the connector of the full-erase head.

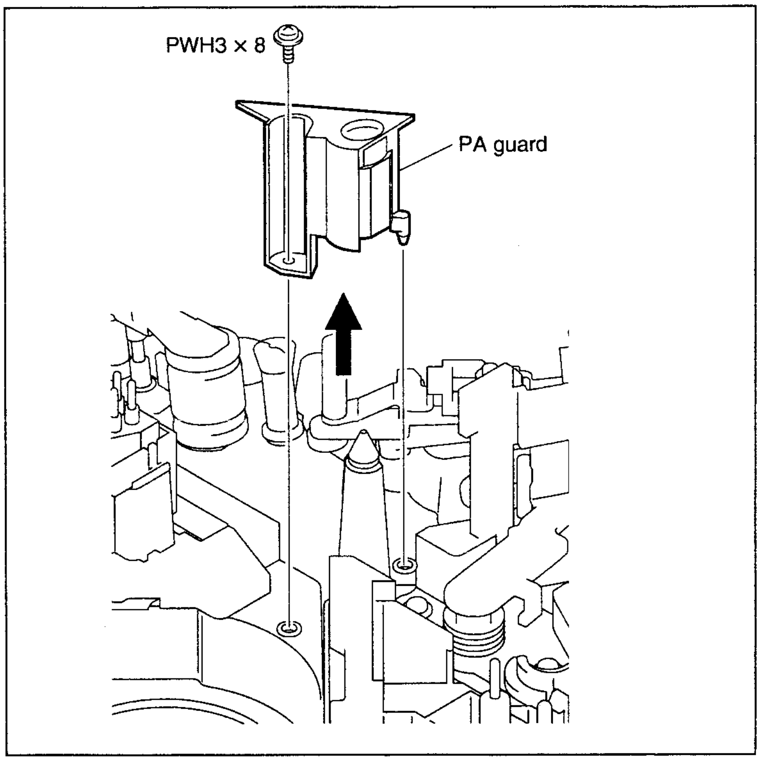
(3) Disconnect the harness from the connector of the CTL head.


Harness
(Recorder only)
Harness
Full-erase head
(Recorder only)
CTL head
AT head assembly
Harness
DT-47 board
CN220
Flexible board

Disconnect the Flexible Board and the Harnesses

4. Removing the PA Guard

Remove the one screw to remove PA guard.



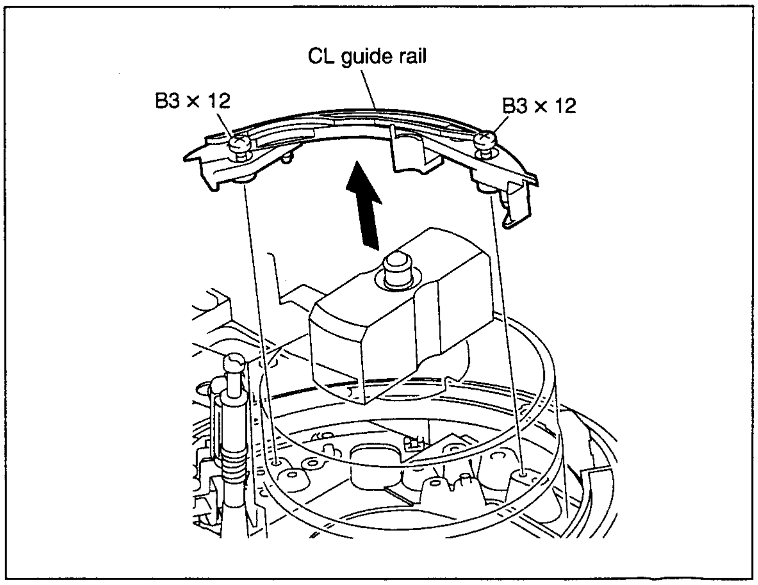
Remove the PA Guard

5. Removing the CL Guide Rail

Fully loosen the two screws to remove the CL guide rail.

Note

Never pull out the screws from the CL guide rail, because the screw section is designed not to fall.



Remove the CL Guide Rail

6. Removing the Pinch Press Assembly

Remove the pinch press assembly.
(Refer to steps 1 and 2 in Section 5-10.)

7. Removing the S Plate Assembly

Remove the S plate assembly.
(Refer to step 1 in Section 5-17-1.)

8. Removing the S Tension Regulator Assembly

Remove the S tension regulator.
(Refer to step 2 in Section 5-21.)

9. Removing the T Drawer Assembly

Remove the T Drawer Assembly.
(Refer to steps 1 and 2 in Section 5-23.)

10. Removing the Gear Box Assembly

Remove the gearbox assembly.
(Refer to steps 1 through 4 in Section 5-19.)

11. Removing the Ring Roller (B)

Remove the screw, then remove the ring roller (B).

Note

Be careful not to touch the drum (especially the video heads).

12. Removing the Threading Ring Assembly

Remove the threading ring assembly from the MD base assembly, while pressing the T tension arm in the arrow direction.

Note

Be careful not to damage the drum (especially the video heads and the tape running surface of the upper drum) and the capstan motor shaft.

Installation

13. Cleaning

Clean the inside of a new threading ring assembly and contcting surface of the ring rollers (A), (B), and (C) with a cleaning cloth moistened with cleaning fluid.

14. Attaching the Threading Ring Assembly

Press the T tension arm in the arrow direction, and install the threading ring assembly while attempting to fit it to the grooves of the ring rollers (A) and (C).

15. Attaching the Ring Roller (B)

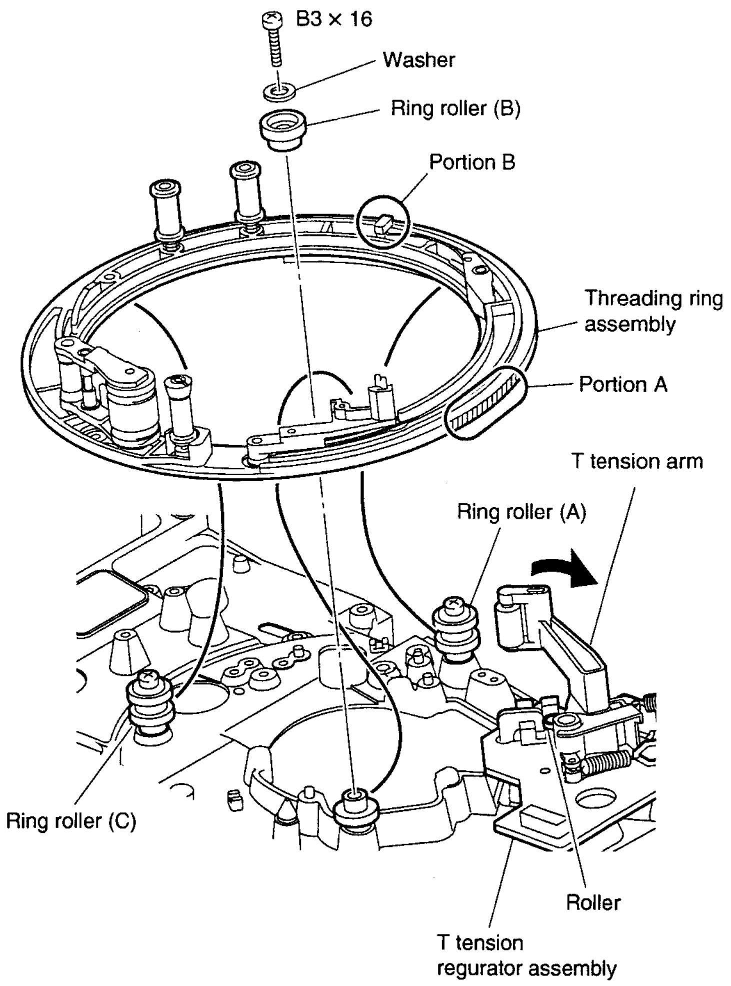
(1) Pass the ring roller (B) through the roller shaft while holding the threading ring assembly so that it does not come off from the grooves of the ring rollers (A) and (C). Then tighten the screw.
Tightening torque: 49.0 × 10^{-2} N•m
{5.0 kgf•cm}

(2) Check that the threading ring assembly does not come off from the three ring rollers.
And check that the roller of the T tension regulator assembly is set along the side of the threading ring as shown in the figure (portion A).

16. Confirming the Threading Ring Operation

Turn the portion B of the threading ring assembly vertically with fingers and confirm that the threading ring and the three ring rollers rotate smoothly while repeating the threading and unthreading.

* Omits the illustration of parts around the threading ring (drum etc.).



Remove/Attach the Threading Ring Assembly

17. Reattaching the Gear Box Assembly

Reattach the gear box assembly.
(Refer to steps 5 and 6 in Section 5-19.)

18. Reattaching the Pinch Press Assembly

Reattach the pinch press assembly.
(Refer to steps 3 and 4 in Section 5-10.)

19. Putting the Unit into the Unthreading End Mode

(Refer to step 2 in Section 5-1-2.)

20. Reattaching the S Tension Regulator Assembly

Reattach the S tension regulator assembly.
(Refer to step 3 in Section 5-21.)

21. Reattaching the S Plate Assembly

Reattach the S plate assembly.
(Refer to step 2 in Section 5-17-1.)

22. Reattaching the T Drawer Assembly

Reattach the T drawer assembly and confirm the T drawer assembly operation.
(Refer to step 3 through 6 in Section 5-23.)

23. Attaching the CL Guide Rail

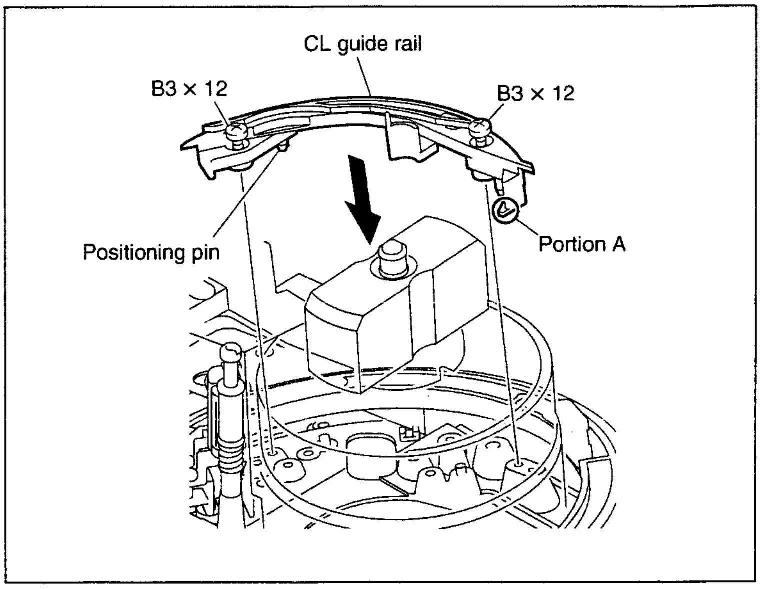
(1) Check if the deck is in the unthreading end state.
(2) Insert the portion A of the CL guide rail to the bottom of the drum.
(3) Match and attach the positioning pin of the CL guide rail to the positioning hole of the MD base assembly.
(4) Tighten the two screws.

24. Confirming the CL Arm Assembly Operation

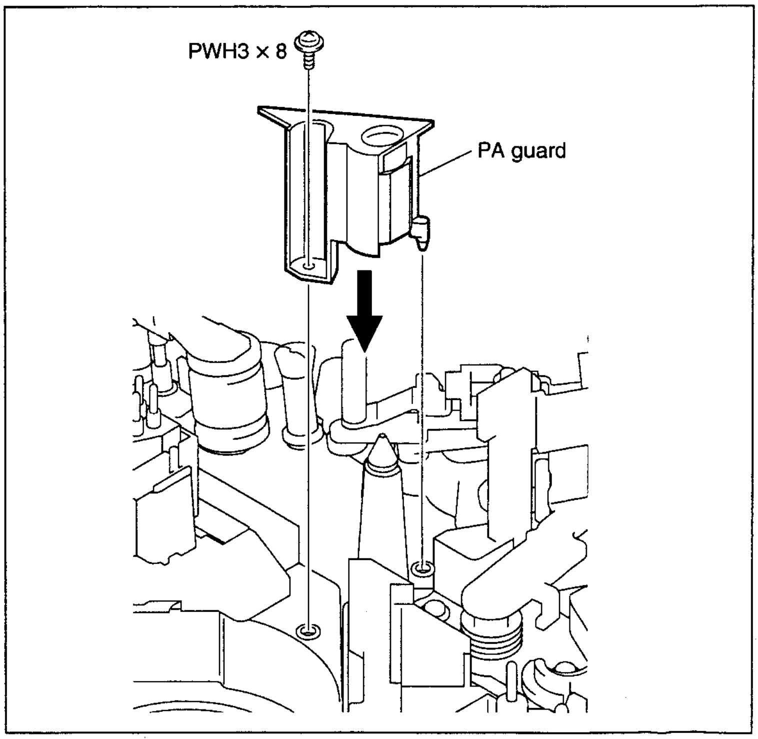
Confirm the CL arm assembly operation.
(Refer to step 3 in Section 5-6.)

25. Reattaching the PA Guard

(1) Put the PA guard through the cassette brace, then match the pins with the holes of the MD base assembly.
(2) Tighten the one screw.
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}



Attach the CL Guide Rail



Attach the PA Guard

26. Reconnecting the Flexible Board

Reconnect the flexible board to the connector CN220 on the DT-47 board and lock it.

27. Reconnecting the Harness

(1) Reconnect the harness to the connector of the AT head assembly.

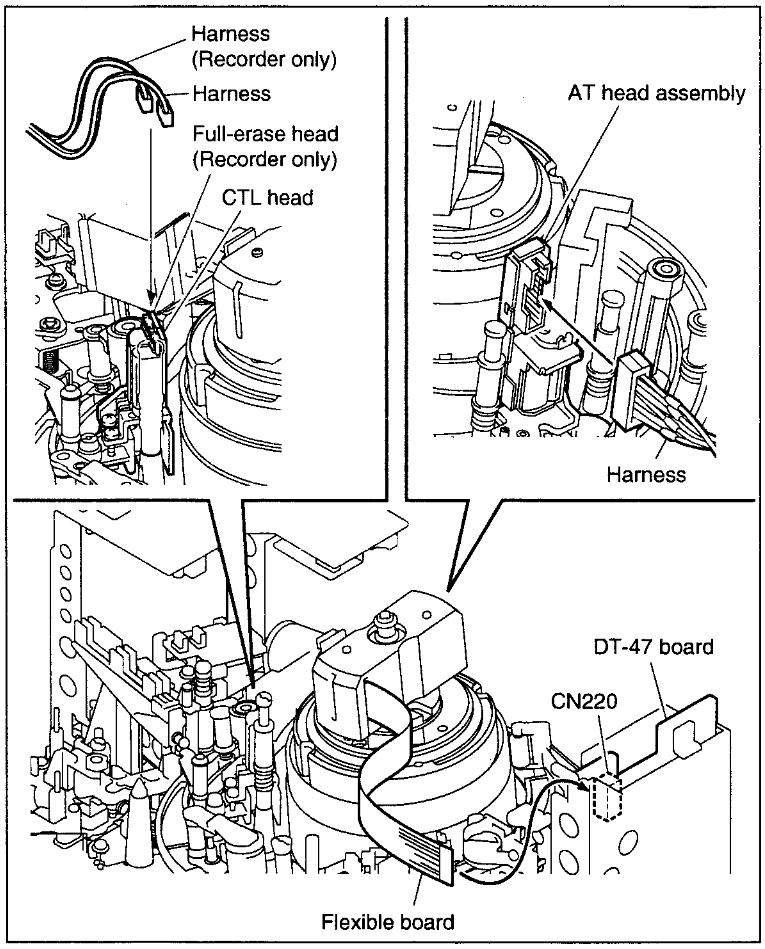
(2) **For recoreder only**

Reconnect the harness to the connector of the full-erase head.

(3) Reconnect the harness to the connector of the CTL head.

28. Reattaching the W Cleaner Assembly

Reattach the W cleaner assembly.
(Refer to steps 4 through 6 in Section 5-5.)


Harness
(Recorder only)
Harness
Full-erase head
(Recorder only)
CTL head
AT head assembly
Harness
DT-47 board
CN220
Flexible board

Connect the Flexible Board and the Harnesses

Adjustment after Replacement

29. Confirming the Cleaning Solenoid Operation

Refer to Section 3-2-2.
(C023 : CLEANING ROLLER)

30. Performing the Tension Offset Adjustment

Refer to Section 3-3-2.
(A00A : S/T TENSION OFFSET)

31. Confirming the Pinch Press Clearance

Refer to step 5 in Section 5-10.

32. Adjusting the Tape Running

MSW Recorder	⇨ Refer to Section 6-2.
MSW Player	⇨ Refer to Section 6-3.
HDW Recorder	⇨ Refer to Section 6-4.
HDW Player	⇨ Refer to Section 6-5.
DVW Recorder	⇨ Refer to Section 6-6.

33. Confirming the Tape Running

Refer to Section 6-7.

5-21. S Tension Regulator Assembly Replacement

Outline

Replacement

1. Removing the S Plate Assembly (Refer to step 1 in Section 5-17-1.)
2. Removing the S Tension Regulator Assembly
3. Attaching the S Tension Regulator Assembly
4. Reattaching the S Plate Assembly (Refer to step 2 in Section 5-17-1.)

Adjustment after Replacement

5. Performing the Tension Offset Adjustment (A00A : S/T TENSION OFFSET) (Refer to Section 3-3-2.)
6. Adjusting the Tape Running
   MSW Recorder ⇨ Refer to Section 6-2.
   MSW Player ⇨ Refer to Section 6-3.
   HDW Recorder ⇨ Refer to Section 6-4.
   HDW Player ⇨ Refer to Section 6-5.
   DVW Recorder ⇨ Refer to Section 6-6.
7. Confirming the Tape Running (Refer to Section 6-7.)

Note

The S tension regulator assembly comprises of precision components and is adjusted strictly. When removing/installing, use extreme care to turn only screws specified.

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the unit into the unthreading end mode. (Refer to step 2 in Section 5-1-2.)
2. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

1. Removing the S Plate Assembly

Remove the S plate assembly.
(Refer to step 1 in Section 5-17-1.)

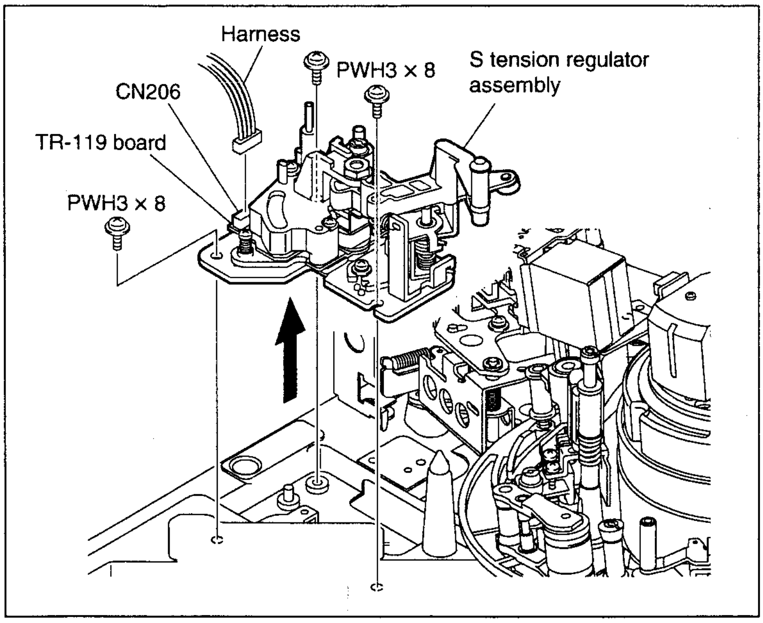
2. Removing the S Tension Regulator Assembly

(1) Remove the three screws to remove the S tension regulator assembly.

(2) Disconnect the harness from the connector CN206 on the TR-119 board.

Note

Be careful not to apply excessive force to the board when removing the harness.


Harness
PWH3 x 8
S tension regulator assembly
CN206
TR-119 board
PWH3 x 8

Remove the S Tension Regulator Assembly

Installation

3. Attaching the S Tension Regulator Assembly

(1) Clean the mounting surfaces between the S tension regulator assembly and the MD base assembly (three contact surfaces).

(2) Connect the harness to the connector CN206 on the TR-119 board.

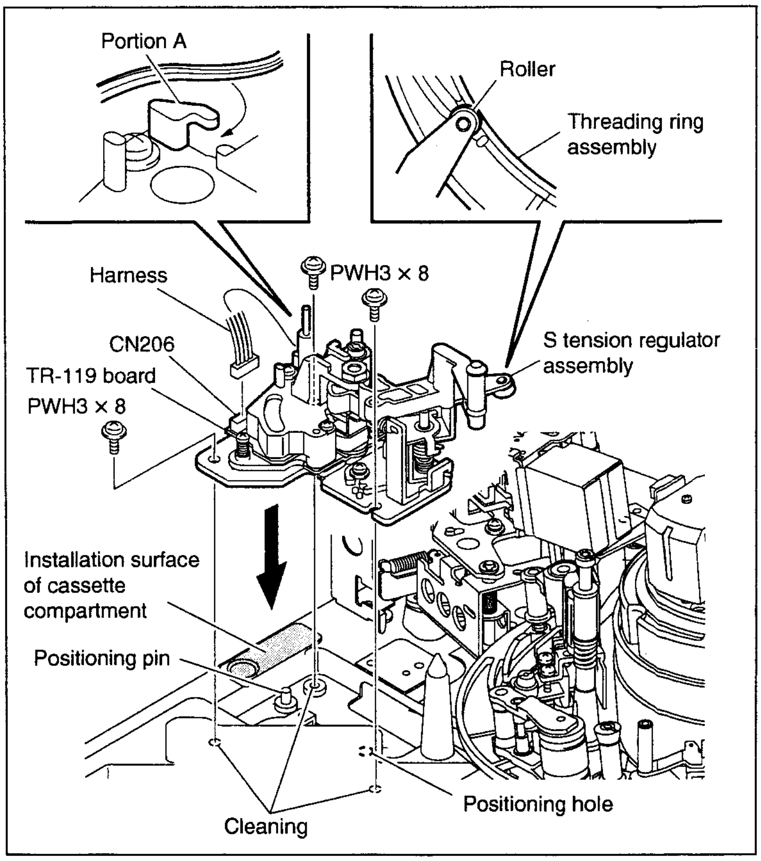
(3) Hook the harness on the A portion of the S tension regulator.

(4) Match the S tension regulator assembly with the positioning pin and the positioning hole of the MD base assembly then fasten with three screws so that the roller portion comes to the position as shown in the figure of the threading ring assembly.
Tightening torque: 78.4×10^{-2} N•m
{8.0 kgf•cm}

(5) Check that the harness is not on the cassette compartment mounting surface (shaded portion in the figure).

4. Reattaching the S Plate

Reattach the S plate assembly.
(Refer to step 2 in Section 5-17-1.)


Portion A
Roller
Threading ring assembly
Harness
PWH3 x 8
CN206
TR-119 board
PWH3 x 8
S tension regulator assembly
Installation surface of cassette compartment
Positioning pin
Positioning hole
Cleaning

Attach the S Tension Regulator Assembly

Adjustment after Replacement

5. Performing the Tension Offset Adjustment

Refer to Section 3-3-2.
(A00A : S/T TENSION OFFSET)

6. Adjusting the Tape Running

MSW Recorder	⇨ Refer to Section 6-2.
MSW Player	⇨ Refer to Section 6-3.
HDW Recorder	⇨ Refer to Section 6-4.
HDW layer	⇨ Refer to Section 6-5.
DVW Recorder	⇨ Refer to Section 6-6.

7. Confirming the Tape Running

Refer to Section 6-7.

5-22. T Tension Regulator Assembly Replacement

Outline

Replacement

1. Shifting the TG-6
2. Disconnecting the Flexible Board (CN220/DT-47 Board)
3. Removing the DT-47 Board
4. Removing the T Tension Regulator Assembly
5. Attaching the T Tension Regulator Assembly
6. Confirming the T Tension Regulator Assembly Operation
7. Reattaching the DT-47 Board
8. Reconnecting the Flexible Board (CN220/DT-47 Board)

Adjustment after Replacement

9. Performing the Tension Offset Adjustment (A00A : S/T TENSION OFFSET) (Refer to Section 3-3-2.)
10. Confirming the Tape Running at Drum Exit Side (Refer to Section 6-7-2.)

Note

The T tension regulator assembly comprises of precision components and is adjusted strictly. When removing/installing, use extreme care to turn only screws specified.

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01

Preparation

1. Set the unit into the unthreading end mode. (Refer to step 2 in Section 5-1-2.)
2. Turn the power off and disconnect the power cord.
3. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
4. Remove the cassette compartment. (Refer to Section 1-5.)
5. Open the AE-31 board. (Refer to the figure in Section 5-1-2.)

   Note

   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

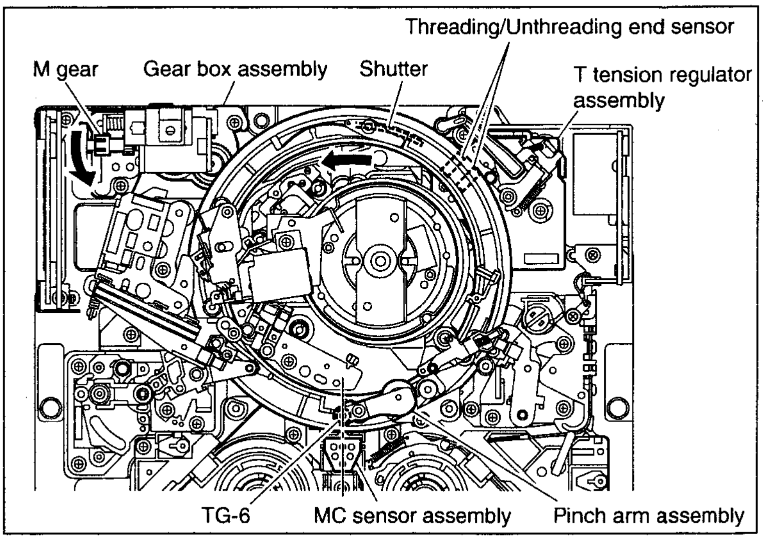
Removal

1. Shifting the TG-6

Turn the M gear of the gearbox assembly in the arrow direction to shift the TG-6 to the position as shown in the figure.

Note

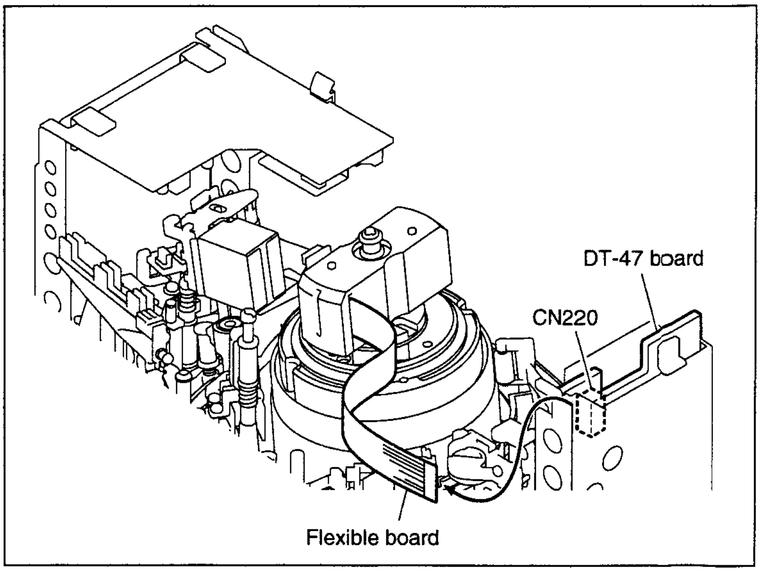
The shutter for detecting the threading/unthreading end will be released from the T tension regulator assembly by turning the threading ring assembly.


Threading/Unthreading end sensor
M gear
Gear box assembly
Shutter
T tension regulator assembly
TG-6
MC sensor assembly
Pinch arm assembly

Shift the TG-6

2. Disconnecting the Flexible Board

Disconnect the flexible board from the connector CN220 on the DT-47 board.

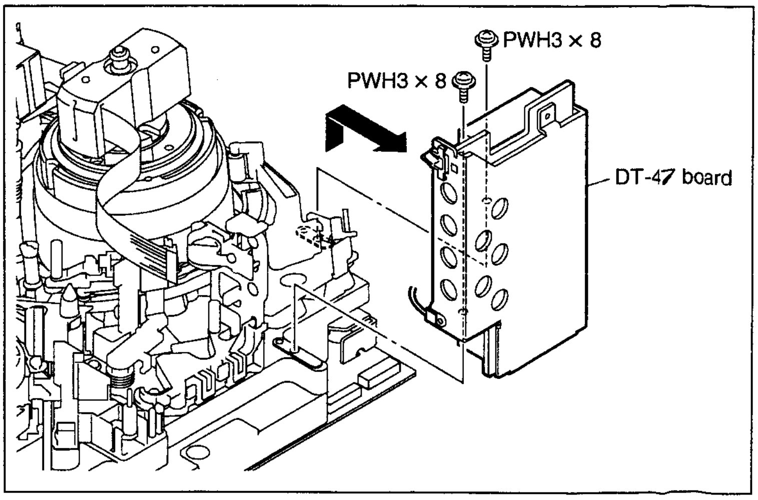

DT-47 board
CN220
Flexible board

Disconnect the Flexible Board

3. Removing the DT-47 Board

(1) Remove the two screws.

(2) Remove the DT-47 board and shift it to the arrow direction
Secure the space to remove the T tension regulator assembly.


PWH3 x 8
PWH3 x 8
DT-47 board

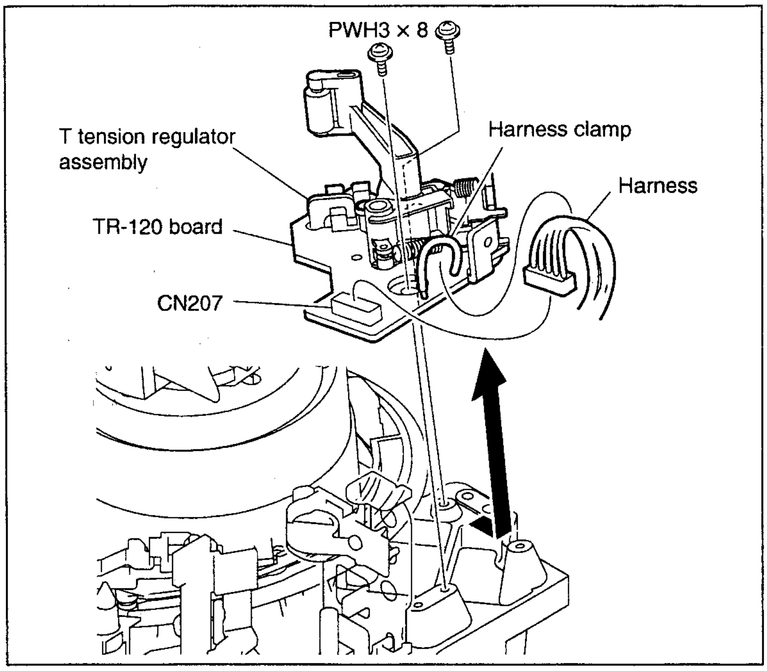
Remove the DT-47 Board

Removal

4. Removing the T Tension Regulator Assembly

(1) Unfasten the harness clamp, then disconnect the harness from the connector CN207 on the TR-120 board.

(2) Remove the two screws and remove the T tension regulator assembly in the arrow direction.


PWH3 x 8
T tension regulator assembly
Harness clamp
Harness
TR-120 board
CN207

Remove the T Tension Regulator Assembly

Installation

5. Attaching the T Tension Regulator Assembly

(1) Align the two positioning boss of the T tension regulator assembly with the positioning holes of the MD base assembly and install it.

Note

Match the position while setting the mounting screw hole as a reference.

(2) Tighten temporarily the two screws to fix the T tension regulator assembly.

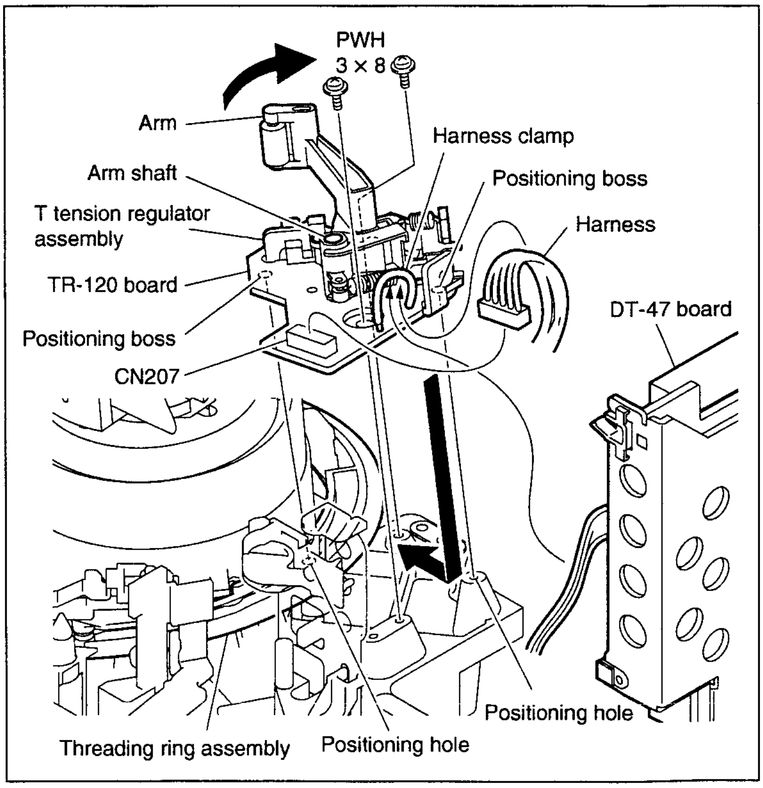
(3) While keeping apart the threading ring assembly by pushing the arm to the arrow direction and slightly press the arm shaft from above with fingers, confirm that the positioning boss is securely within the positioning hole of the M base assembly and fasten with two screws.

(4) Connect the harness to the connector CN207 on the TR-120 board.

(5) Fasten the harness connected to the TR-120 board together with the and harness connected to the DT-47 board with the harness clamp.

Note

Be careful that harnesses does not contact with the moving section of the regulator.


PWH
3 x 8
Arm
Arm shaft
T tension regulator assembly
TR-120 board
Positioning boss
CN207
Harness clamp
Positioning boss
Harness
DT-47 board
Positioning hole
Threading ring assembly
Positioning hole

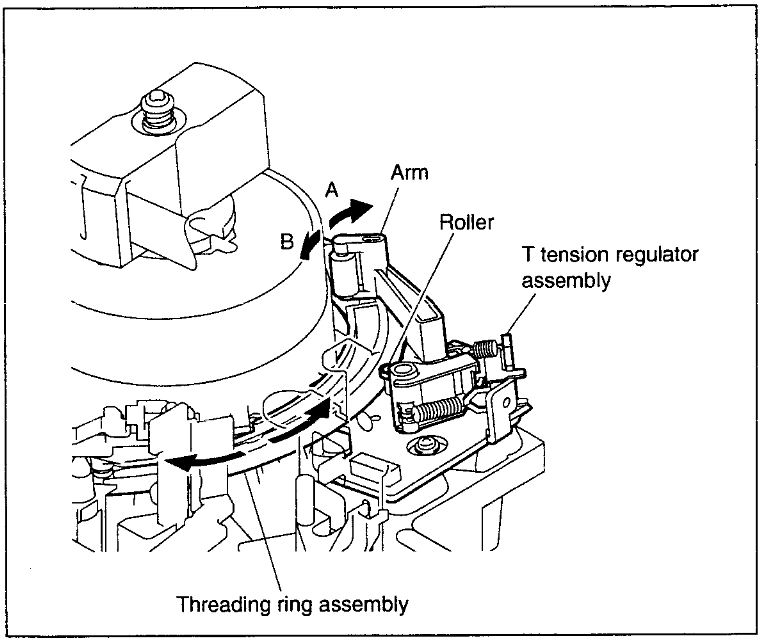
Attach the T Tension Regulator Assembly

6. Confirming the T Tension Regulator Assembly Operation

(1) Turn the M gear of the gear box assembly to let the threading end state.
Confirm the following items at this time.
- The arm of the T tension regulator assembly is set at the regulated position. (Refer to Section 5-1-2.)
- The arm will smoothly return when fingers are released after the arm is lightly pressed in the arrow A direction with fingers.
- The arm will move to the threading ring assembly with no contact when lightly pressed in the arrow B direction with fingers.

(2) Confirm that the roller of the T tension regulator assembly does not come off from the threading ring and operates normally.

If the above items cannot be satisfied, remove and attach the T tension regulator assembly again.



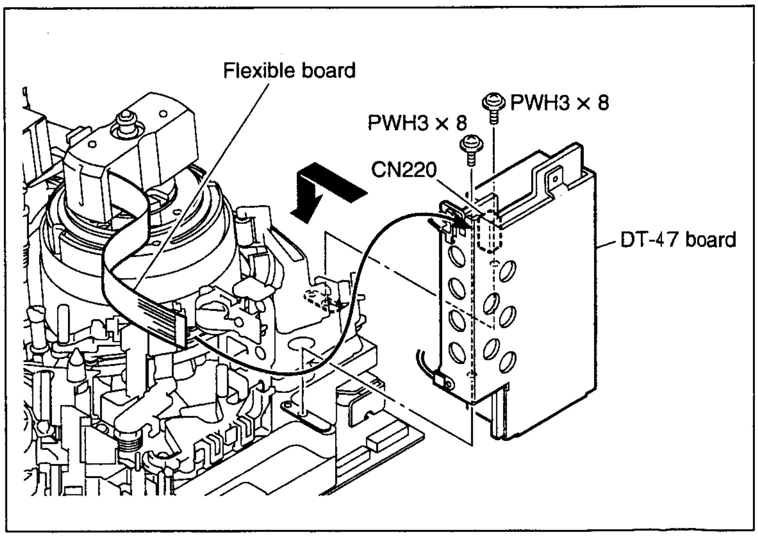
T Tension Regulator Assembly Operation

7. Reattaching the DT-47 Board

Reattach the DT-47 board to the MD base assembly, then tighten it with the two screws.

8. Reconnecting the Flexible Board

Insert and lock the flexible board to the connector CN220 on the DT-47 board.



Reattach the DT-47 Board and Flexible Board

Adjustment after Replacement

9. Performing the Tension Offset Adjustment

Refer to Section 3-2-2.
(A00A : S/T TENSION OFFSET)

10. Confirming the Tape Running at Drum Exit Side

Refer to Section 6-7-2.

5-23. T Drawer Assembly Replacement

Outline

Replacement

1. Removing the ME Wire (T-side only)
2. Removing the T Drawer Assembly
3. Attaching the T Drawer Assembly
4. Attaching the ME Wire (T-side only)
5. Confirming the ME Wire Operation
6. Confirming the T Drawer Assembly Operation
7. Confirming the Tape Running at TG-10 Guide
8. Adjusting the Slant Guide Slantness
9. Reconfirming the Tape Running at TG-10 Guide

Note

The T Drawer Assembly is adjusted the roller height, slant guide, etc. at shipping. Never turn the mounting screws when removing/attaching.

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A
• HDCAM, Digital Betacam or MPEG IMX cassette (L cassette)	

Preparation

1. Set the unit into the unthreading end mode. (Refer to step 2 in Section 5-1-2.)
2. Turn the power off and disconnect the power cord.
3. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
4. Remove the cassette compartment. (Refer to Section 1-5.)

Removal

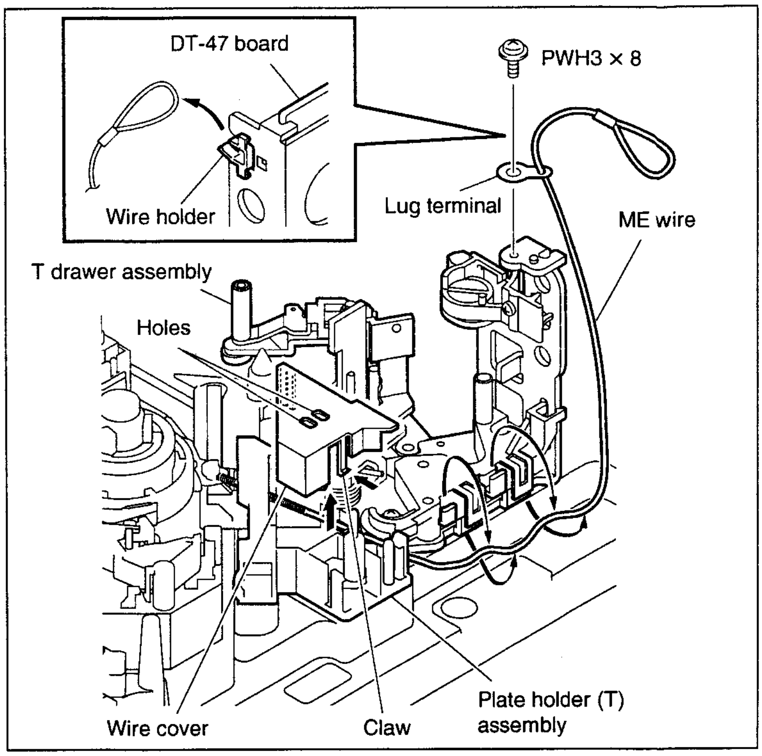
1. Removing the ME Wire (T-side only)

(1) Release the tip of the ME wire from the wire holder.

(2) Remove the screw securing the lug terminal of the ME wire.

(3) Grasp the hole of the wire cover with a pair of pliers, press the claw on the cover in the arrow direction, and remove the wire cover from the plate holder (T) assembly.

(4) Remove the ME wire from the T drawer assembly as shown in the figure.


DT-47 board
PWH3 x 8
Wire holder
Lug terminal
ME wire
T drawer assembly
Holes
Wire cover
Claw
Plate holder (T) assembly

Remove the ME Wire

2. Removing the T Drawer Assembly

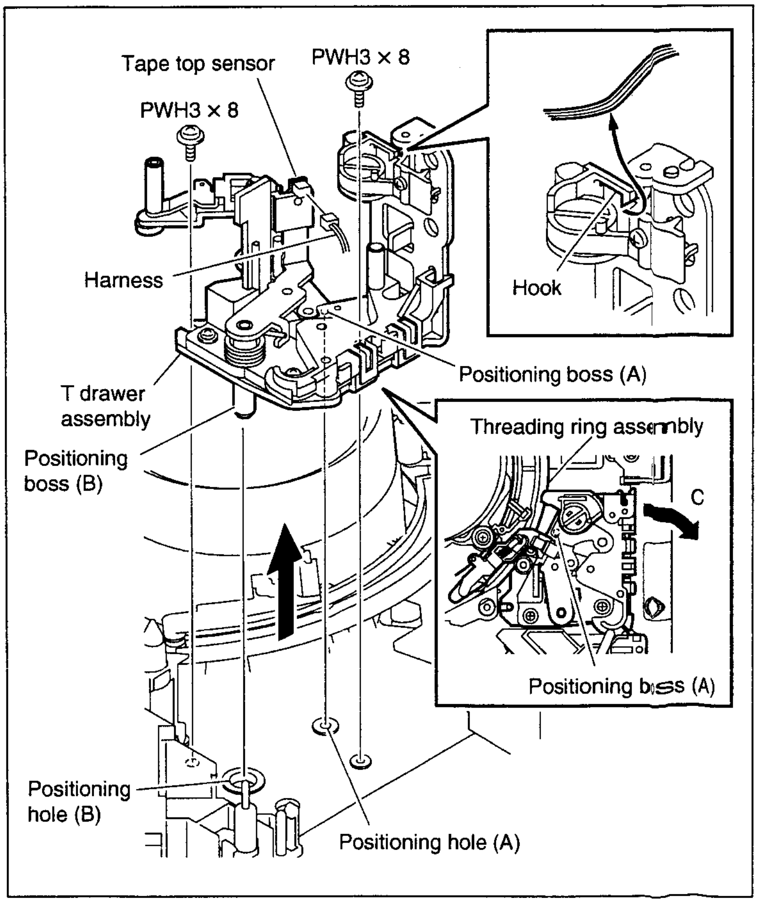
(1) Disconnect the harness from the connector of the tape top sensor.

(2) Release the harness from the hook of the T drawer assembly.

(3) Remove the two screws.

(4) Remove the positioning boss (A) from the positioning hole of the MD base assembly by lifting up the T drawer assembly.

(5) Remove the positioning boss (B) from the positioning hole (B) while turning the T drawer assembly in the arrow C direction.


Tape top sensor
PWH3 x 8
PWH3 x 8
Harness
Hook
Positioning boss (A)
T drawer assembly
Threading ring assembly
Positioning boss (B)
C
Positioning boss (A)
Positioning hole (B)
Positioning hole (A)

Remove the T Drawer Assembly

Installation

3. Attaching the T Drawer Assembly

(1) Clean the mounting surfaces between the T drawer assembly and the MD base assembly.

(2) Insert the positioning boss (B) of the T drawer assembly into the positioning hole (B) at a shallow depth. Fit the positioning boss (A) to the positioning hole (A) by pushing and turning from outside of the thread ring assembly.

(3) Fix the T drawer assembly with the two screws.

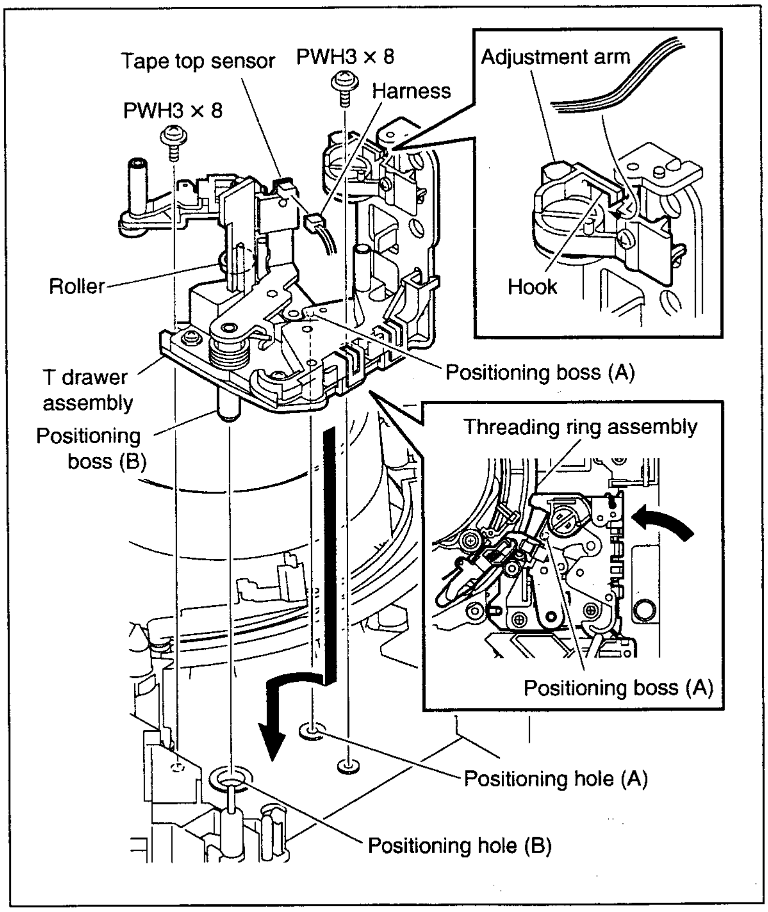
Tightening torque: 78.4 × 10^{-2} N•m
{8.0 kgf•cm}

(4) Connect the harness to the connector of the tape top sensor.

(5) Hang the harness on the hook of the T drawer assembly to fasten it.

Note

Be careful not to apply excessive force to the adjusting arm.


Tape top sensor
PWH3 x 8
PWH3 x 8
Harness
Adjustment arm
Hook
Roller
T drawer assembly
Positioning boss (B)
Positioning boss (A)
Threading ring assembly
Positioning boss (A)
Positioning hole (A)
Positioning hole (B)

Attach the T Drawer Assembly

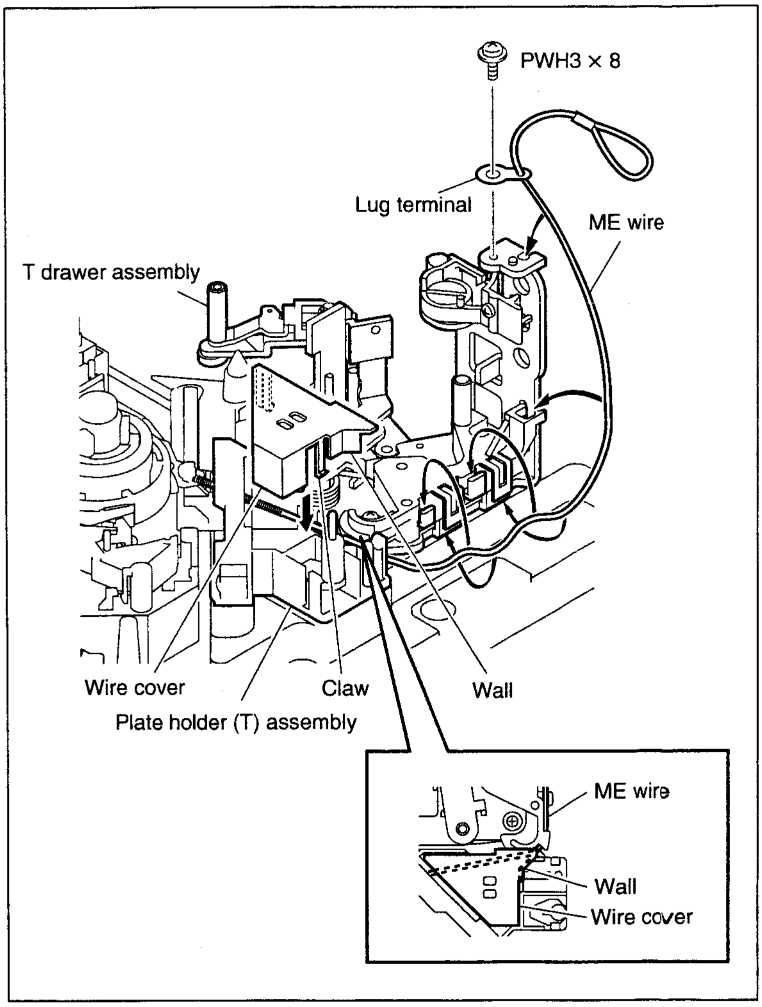
4. Attaching the ME Wire (T-side only)

(1) Hook the ME wire in the T drawer assembly as shown in the figure and fix the lug terminal with the screw.

(2) Set the reel motor assembly to the S cassette position. (Refer to Section 5-1-3.)
Next, mount the wire cover to the plate holder (T) assembly from the top, and secure with the claw of the wire cover.

Note

Make sure the ME wire does not protrude out of the wall of the wire cover. (See the figure.)


PWH3 x 8
Lug terminal
ME wire
T drawer assembly
Wire cover
Claw
Wall
Plate holder (T) assembly
ME wire
Wall
Wire cover

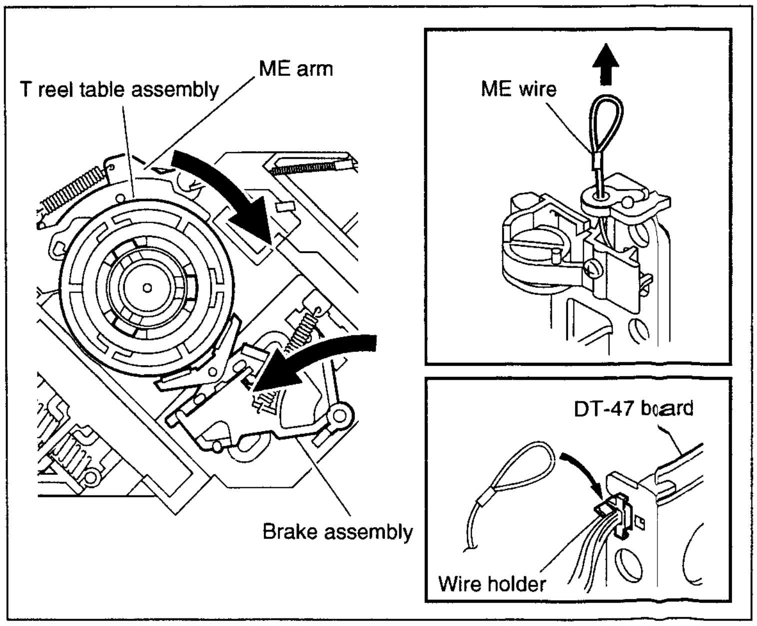
Attach the ME Wire

5. Confirming the ME Wire Operation

(1) Confirm that the ME arm and T real table assembly are in mesh and the T-side reel table rotates when lifting the loop of the tip of the ME wire upwardly.
Perform the check each at the L cassette position and S cassette position. (As for the method of shifting the reel table, refer to Section 5-1-3.)

(2) After confirmation, hang the tip of the ME wire on the wire holder and close the wire holder.

(3) Turn the T reel table while pressing the reel brake assembly in the arrow direction, and confirm that the T reel table rotates smoothly without contacting with the ME arm.


T reel table assembly
ME arm
Brake assembly
ME wire
DT-47 board
Wire holder

Confirm the ME Wire Operation

6. Confirming the T Drawer Assembly Operation

(1) When the threading ring rotates toward the threading end direction, check that the portion A of the threading ring pushes the roller of the T drawer assembly and the drawer guard certainly. And at this time, check that the lower surface of the roller does not come in contact with the surface B of the threading ring (shaded portion in the figure).

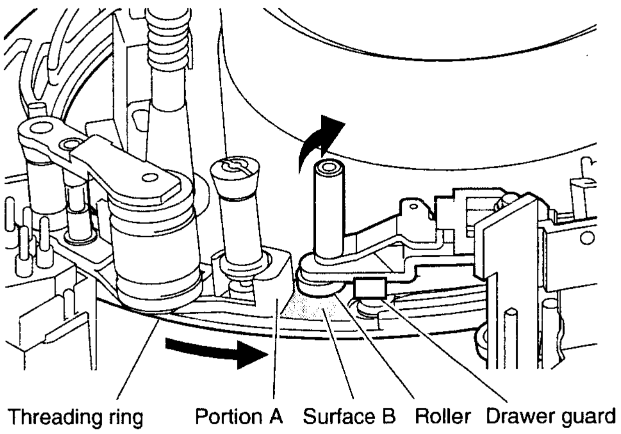
(2) When threading, check that the portion C of the threading ring pushes certainly the roller of the lock arm assembly, and also check that the pin of the lock arm assembly pushes certainly the drawer guard.

(3) When the threading ring rotates toward the unthreading end direction, check that the roller of the T drawer assembly moves inside to the threading ring smoothly. And at this time, check that the lower surface of the roller does not come in contact with the surface B of the threading ring (shaded portion in the figure).

(4) When unthreading, check that the lock arm assembly of the T drawer assembly returns smoothly.

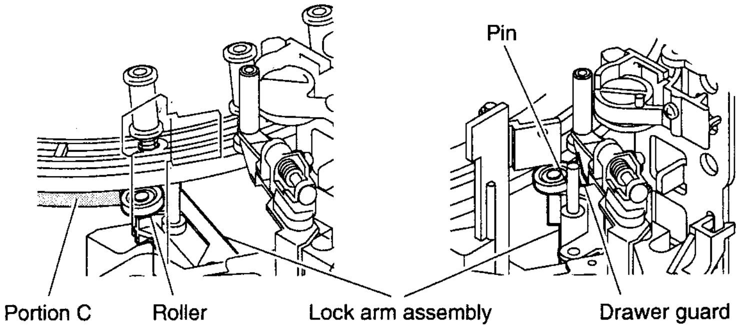
If the above items cannot be satisfied, remove and attach the T drawer assembly again.

- Threading

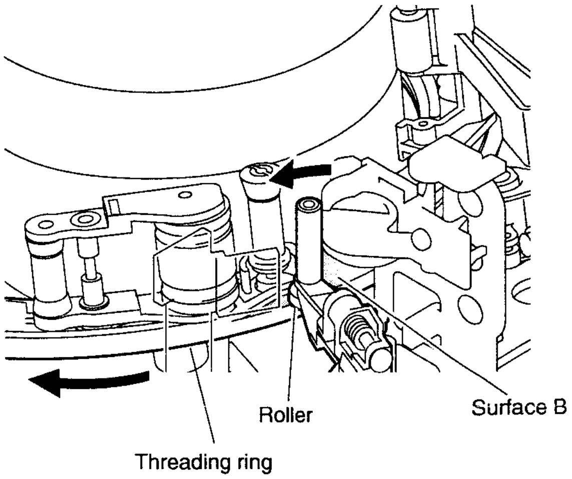


At the threading state, the lower surface of the roller does not touch with the surface B of the threading ring.

- Threading
- Threading end



- Unthreading



At the unthreading state, the lower surface of the roller does not touch with the surface B of the threading ring.

Confirm the T Drawer Assembly Operation

7. Checking the Tape Running at TG-10 Guide

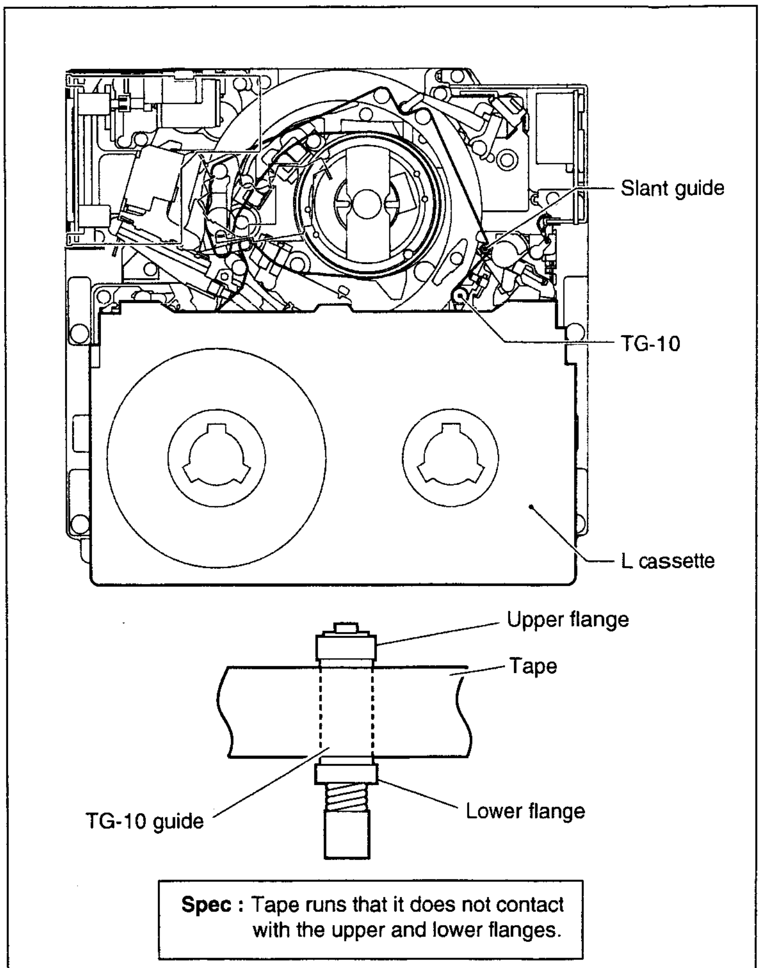
(1) Turn on the power then place the reel motor plate assembly in the L cassette position. (Refer to Section 5-1-3.)

(2) Set the L cassette and put a weight on the cassette so that it does not rise up.

(3) Put the unit into F. FWD mode once. About three seconds later, put the unit into FWD mode.

(4) Check that the tape running condition satisfies the specification at TG-10 guide.

If the specification is not satisfied, confirm the T drawer attachment and the cassette that has been used for the tape running.
After confirmation, again perform the step 7. If the specification cannot be satisfied, perform the steps 8 and 9.



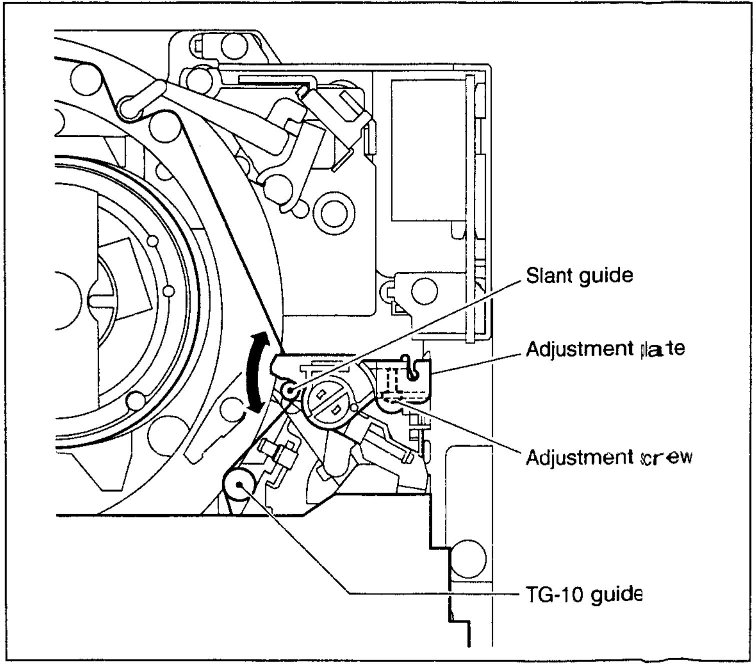
Spec : Tape runs that it does not contact with the upper and lower flanges.

Tape Running Check at TG-10 Guide

8. Adjusting the Slant Guide Slantness

Adjust the adjustment plate position by turning the adjustment screw so that the specification is satisfied.

- If the tape runs in contact with the upper flange of TG-10 : Turn the adjustment screw counterclockwise.
- If the tape runs in contact with the lower flange of TG-10 : Turn the adjustment screw clockwise.



Adjust the Slant Guide Slantness

9. Rechecking the Tape Running at TG-10 Guide

(1) Put the unit into the unthreading end mode.

(2) Then put the unit into PLAY mode, and check again that the tape running condition satisfies the specification at TG-10 guide.

If the specification is not satisfied, repeat steps 8 and 9 mentioned above.

5-24. Cassette Compartment Motor Replacement

Outline

Replacement

1. Disconnecting the Harness (CN935/CL-29 Board)
2. Removing the Warm
3. Removing the Cassette Compartment Motor
4. Removing the Motor Joint
5. Removing the Spacer and Disconnecting the Harness
6. Soldering the Harness
7. Attaching the Motor Joint
8. Attaching the Spacer and Worm
9. Attaching the Cassette Compartment Motor
10. Applying the Grease
11. Reconnecting the Harness (CN935/CL-29 Board)

Adjustment after Replacement

12. Checking the Cassette Compartment Motor Operation (Refer to Section 3-2-2.) (C013: CASSETTE COMP. MOTOR)

Preparation

1. Turn off the power and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the cassette compartment. (Refer to Section 1-5.)

Tools

• L wrench (Across flat has 0.89 mm):	7-700-736-06
• Grease (SGL-601):	7-651-000-10
• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-573-01
• Calipers (or the equivalent)	

Removal

1. Disconnecting the Harness

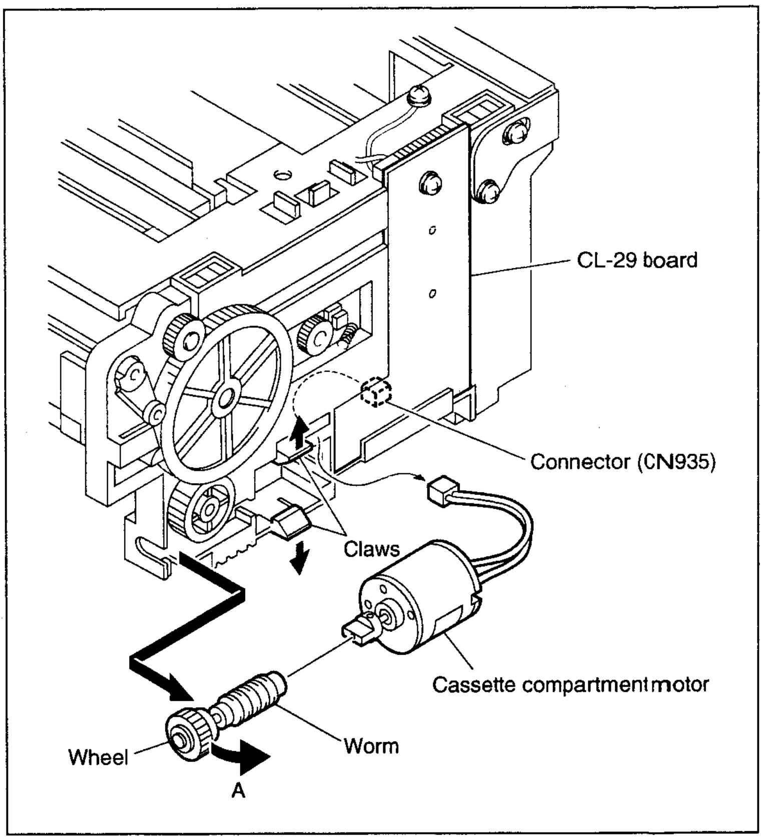
Disconnect the harness from the connector CN935 on the CL-29 board.

2. Removing the Worm

Push the wheel in the direction indicated by arrow A and take out the worm.

3. Removing the Cassette Compartment Motor

Spread the claw of the chassis and push out the cassette compartment motor from the inside of the cassette compartment.


CL-29 board
Connector (CN935)
Claws
Cassette compartment motor
Wheel
Worm
A

Remove the Cassette Compartment Motor (1)

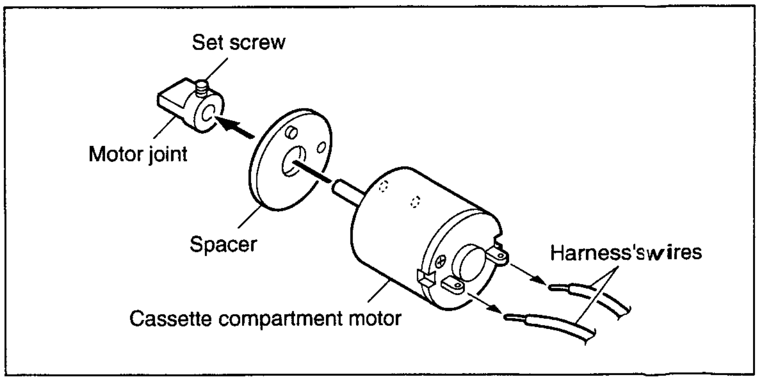
4. Removing the Motor Joint

Loosen the set screw by two to three turns and remove the motor joint.

5. Removing the Spacer and Disconnecting the Harness

(1) Remove the spacer.

(2) Unsolder and disconnect the harness's wires from the motor.


Set screw
Motor joint
Spacer
Harness'swires
Cassette compartment motor

Remove the Cassette Compartment Motor (2)

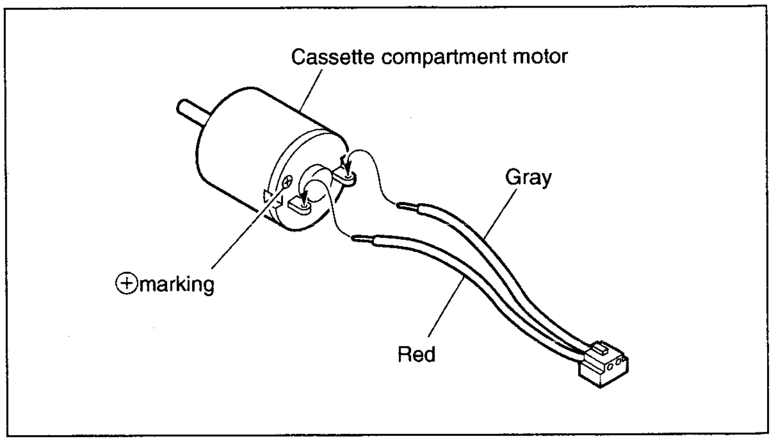
Installation

6. Soldering the Harness

Solder the harness's wires disconnected in (2) of step 5 to a new motor.

Note

Solder a red wire to the side of marking "+" of the motor.

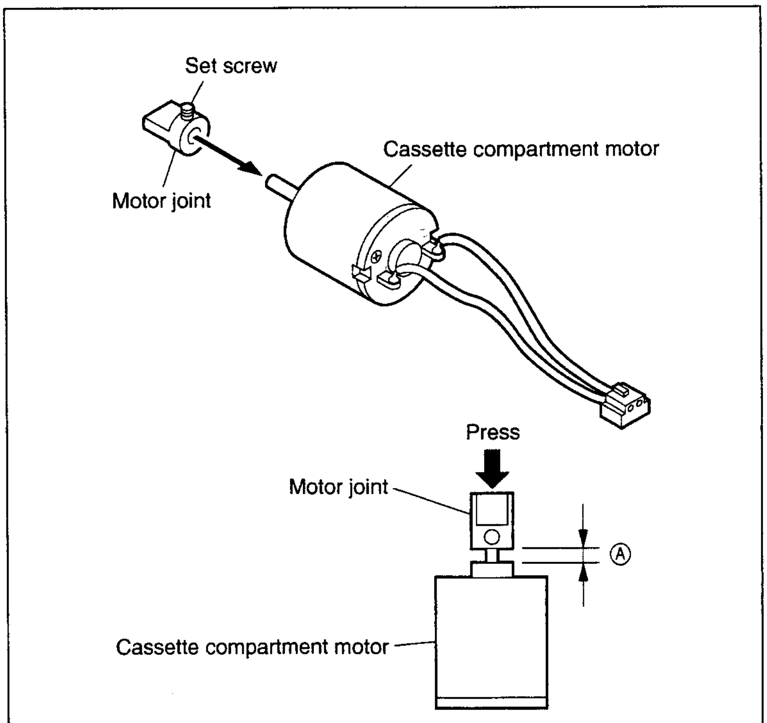

Cassette compartment motor
Gray
⊕marking
Red

Harness Soldering

7. Attaching the Motor Joint

(1) Pass the motor joint through the shaft of the motor and temporarily tighten the set screw.

(2) Confirm that the clearance between the motor joint and motor satisfies the specification when the motor joint is pushed toward the motor, and tighten the set screw.
Tightening torque: 60×10^{-2} N•m
{6 kgf•cm}

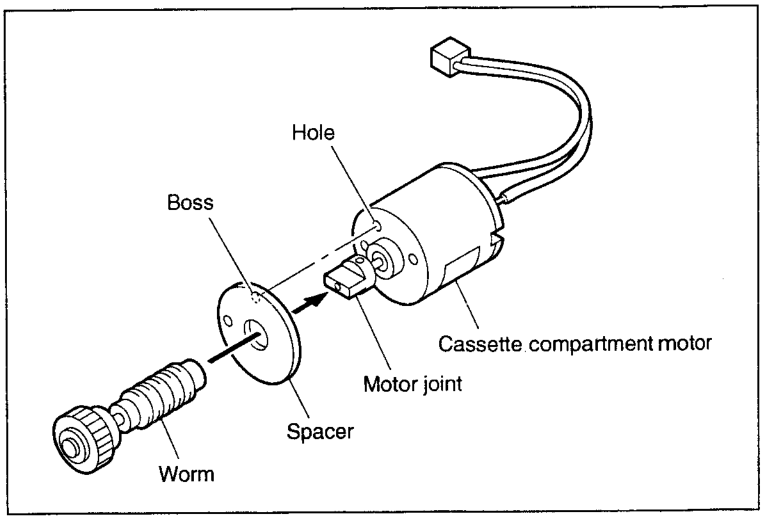

Set screw
Cassette compartment motor
Motor joint
Press
Motor joint
Ⓐ
Cassette compartment motor

Spec.: 3.8 mm ≦ Ⓐ ≦ 4.2 mm

Attach the Motor Joint

8. Attaching the Spacer and Worm

(1) Fit the boss of the spacer in the hole of the motor.
(2) Insert the worm to with the motor joint.
(3) Wipe the grease on the worm and clean it.


Hole
Boss
Cassette compartment motor
Motor joint
Spacer
Worm

Attach the Spacer and Warm

9. Attaching the Cassette Compartment Motor

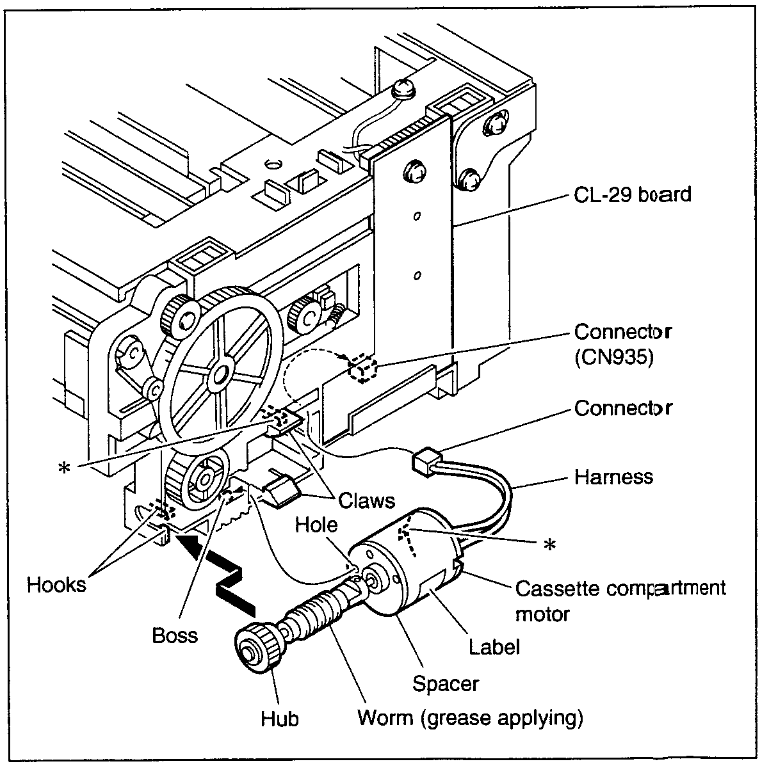
(1) Position the motor as shown in the figure and pass the harness through the hole of the chassis.
(2) Match the * marked portion of the motor with the * marked portion of the chassis and fit the motor in the two claws while inserting the hole of the spacer into the boss of the chassis. Simultaneously, fit the hub of the worm in the two claws of the chassis.
(3) Confirm that the motor has been fixed.

10. Applying the Grease

Slightly apply the grease to the worm.

11. Reconnecting the Harness

Reconnect the harness of the cassette comportment motor to the connector CN935 on the CL-29 board.


CL-29 board
Connector (CN935)
Connector
Harness
*
Claws
Hole
*
Hooks
Cassette compartment motor
Boss
Label
Spacer
Hub
Worm (grease applying)

Attach the Cassette Compartment Motor

Adjustment after Replacement

12. Checking the Cassette Compartment Motor Operation

Refer to Section 3-2-2.
(C013: CASSETTE COMP.)

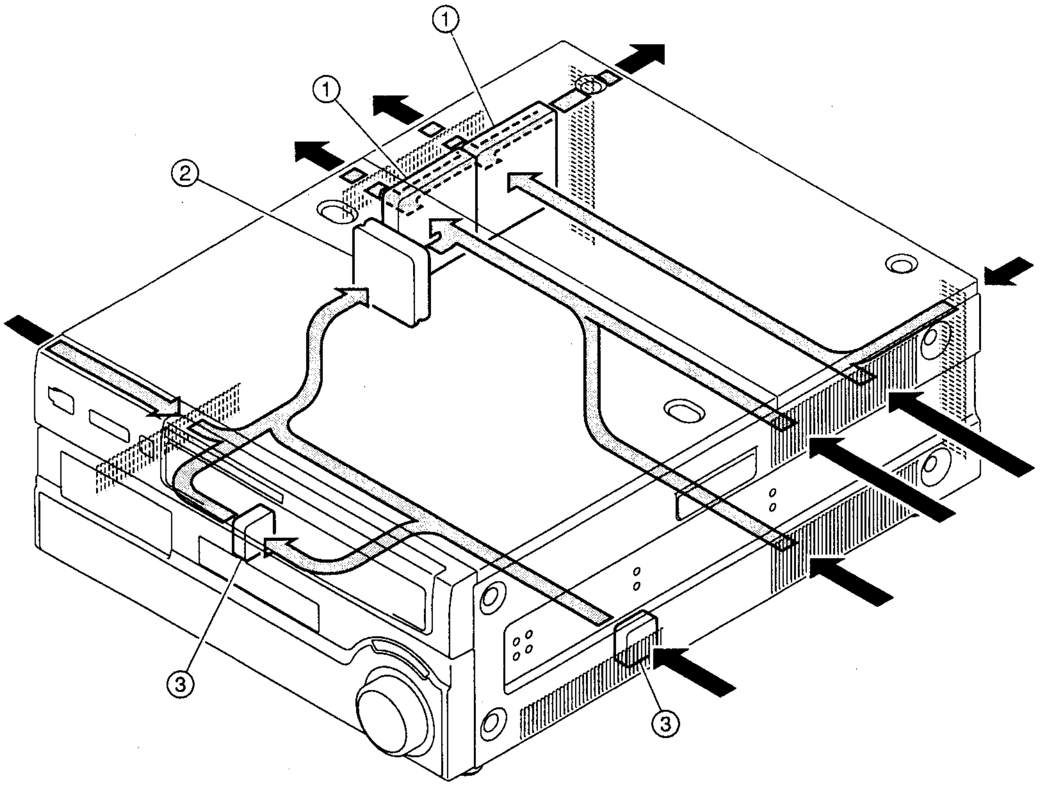
Note

Perform this check with the cassette compartment installed in the unit.

5-25. Fan Motor Replacement

This unit has five fan motors. Replace each fan motors every 40,000 hours of energizing.

1. Index



①Fan motors (For plug-in board)
②Fan motor (For power unit)
③Fan motors (For mecha deck)

2. Notes

- Replace the fan motors when displaying a alarm informing for fan motor in addition to the periodic replacement.
- When the fan motor stops because of trouble, some components inside the unit may be heated to high temperatures.
  Take care not to burn your hands by touching these components.
  In service operation, turn off the power and perform the service operation after the temperatures turns to ordinary state.

5-25-1. Fan Motor (for Plug-in Board) Replacement

Outline

Replacement

1. Removing the Cable Protector
2. Removing the Guile Rail (L)
3. Removing the Fan Motor
4. Attaching the Fan Motor
5. Reattaching the Guide Rail (L)
6. Reattaching the Cable Protector

Preparation

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
3. Remove all the plug-in boards. (Refer to Section 1-12.)

Replacement

1. Removing the Cable Protector

Slide the cable protector in the arrow derection A to remove.

2. Removing the Guide Rail (L)

(1) Remove the SDI/SDTI cablings.

(2) Lift up the bottom part of the guide rail (L) and remove the guide rail (L) from three hooks of the chassis.

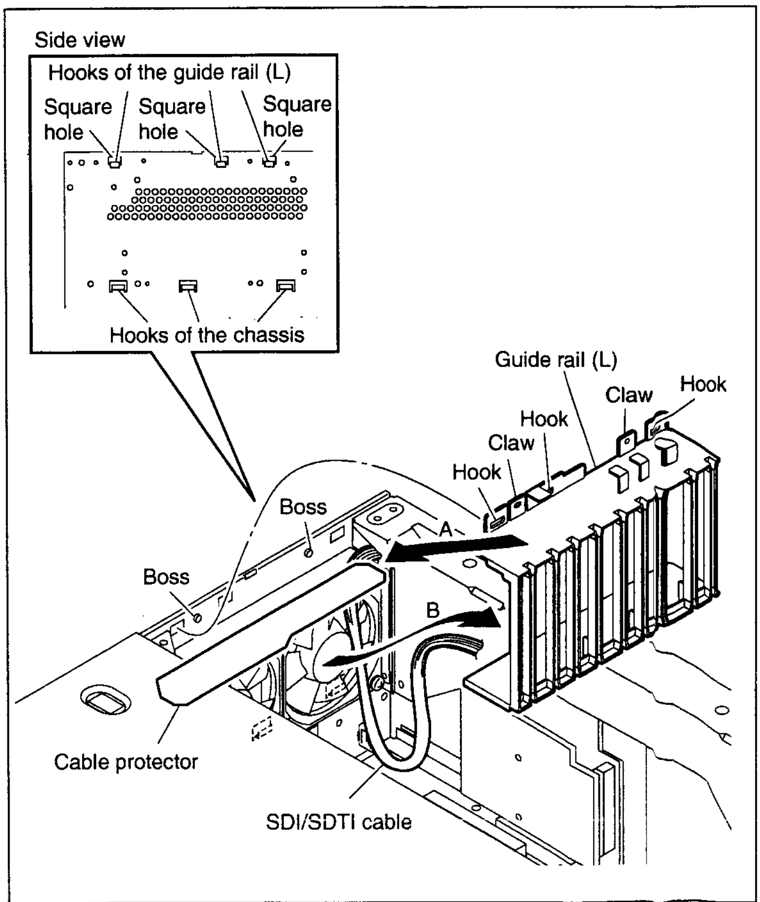
Note

The guide rail (L) can be removed easier from three hooks of the chassis if you hold it with a thumb up and other fingers down then lift up the bottom while pressing with a thumb.

(3) Remove the two claws of guide rail (L) from the bosses of the chassis.

(4) Remove the three hooks from the square holes of the chassis while lifting up the whole guide rail (L).

(5) Remove the guide rail (L) in the arrow direction B.


Side view
Hooks of the guide rail (L)
Square hole
Square hole
Square hole
Hooks of the chassis
Guide rail (L)
Claw
Hook
Hook
Claw
Hook
Boss
Boss
A
B
Cable protector
SDI/SDTI cable

Remove the Cable Protector and Guide Rail (L)

3. Removing the Fan Motor

(1) Disconnect the fan harness from the connector CN71 or CN72 on the MB-884 board.

(2) Remove the two screws to remove the fan motor.

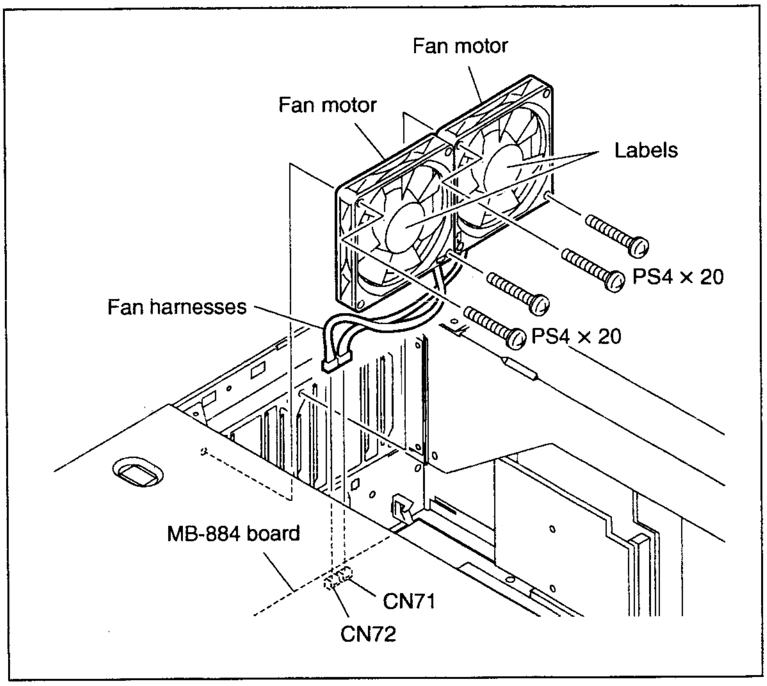
4. Attaching the Fan Motor

Attach a new fan motor in the direction as shown in the figure, then tighten it with two screws.

Tightening torque: 140 × 10^{-2} N•m
{14.0 kgf•cm}

Note

Pay attention not to mistake the direction of the labeled side and the harness direction.


Fan motor
Fan motor
Labels
PS4 x 20
PS4 x 20
Fan harnesses
MB-884 board
CN71
CN72

Remove/Attach the Fan Motor

5. Reattaching the Guide Rail (L)

(1) Cover the fan motor with the guide rail (L).

(2) Match the three hooks of the guide rail (L) to the square holes of the chassis, and match the three hooks of the chassis to the bottom part of the guide rail (L).

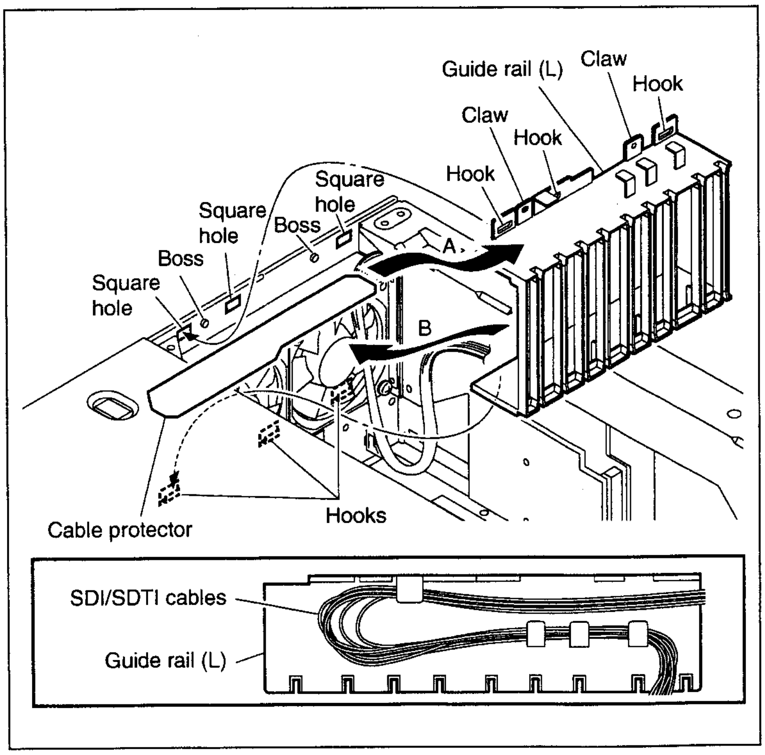
(3) Viewing from the side, check if the three hooks of the guide rail (L) are fit in the square holes of the chassis.

(4) Push the guide rail (L) downward and fix it to the chassis with two claws.

(5) Arrange the SDI/SDTI cables as shown in the figure.

6. Reattaching the Cable Protector

Slide the cable protector in the arrow direction A to reattach.


Guide rail (L)
Claw
Hook
Claw
Hook
Hook
Square hole
Square hole
Boss
Boss
Square hole
A
B
Cable protector
Hooks
SDI/SDTI cables
Guide rail (L)

Attaching the Cable Protector and Guide Rail (L)

5-25-2. Fan Motor (for Power Supply Unit) Replacement

Outline

Replacement

1. Removing the Power Supply Unit (Refer to Step 1 in Section 5-26.)
2. Removing the Fan Motor
3. Attaching the Fan Motor
4. Reattaching the Power Supply Unit (Refer to Step 3 in Section 5-26.)

Preparation

1. Turn the power off and wait more than 30 seconds.
2. Disconnect the power cord from the outlet.
3. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)

Replacement

1. Removing the Power Supply Unit

Remove the power supply unit.
(Refer to step 1 in section 5-26.)

2. Removing the Fan Motor

(1) Remove the three screws and remove the power supply cover.
(2) Remove the binding tie from the fan harness.
(3) Disconnect the fan harness from the connector shown in the figure.
(4) Remove the two screws to remove the fan motor.

3. Attaching the Fan Motor

(1) Attach a new fan motor in the direction as shown in the figure, then fix it with two screws.
Tightening torque: 140 × 10^{-2} N•m
{14.0 kgf•cm}

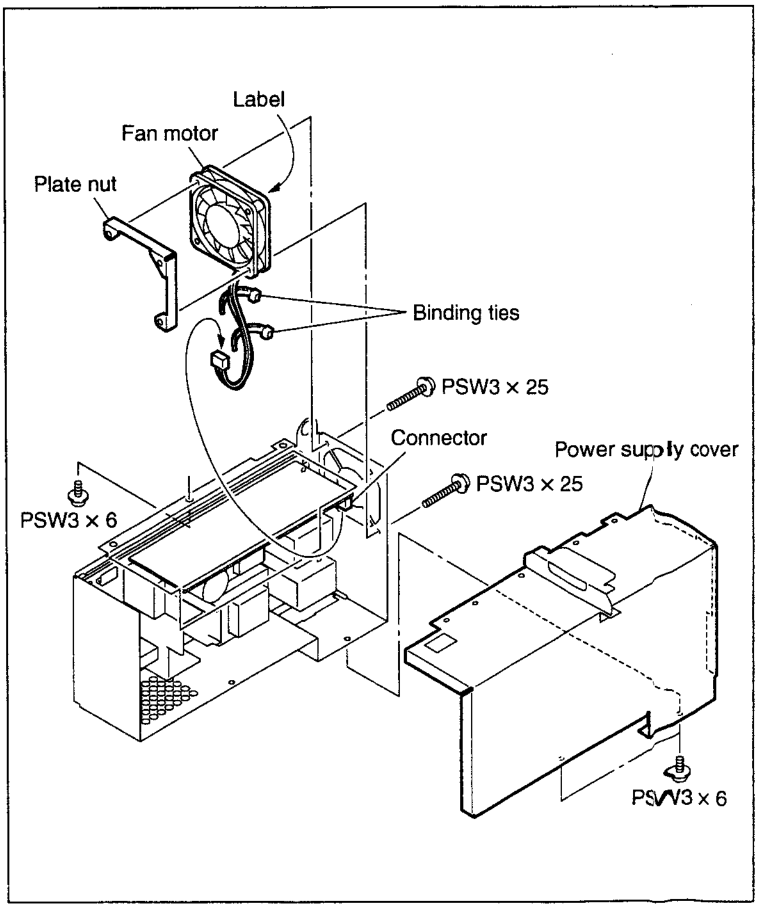
Note

Pay attention not to mistake the direction of the labeled side and the harness direction.

(2) Connect the fan harness to the connector.
(3) Fasten the binding tie to the fan harness as before the replacement.
(4) Reattach the power supply cover with three screws.

4. Reattaching the Power Supply Unit

Reattach the power supply unit.
(Refer to step 3 in section 5-26.)



Remove the Power Supply Unit

5-25-3. Fan Motor (for Mechanical Deck) Replacement

Outline

Replacement

1. Disconnecting the Fan Harness
2. Opening the DR-414/508 Board
3. Removing the Fan Motor
4. Attaching the Fan Motor
5. Closing the DR-414/508 Board
6. Connecting the Fan Harness

Preparation

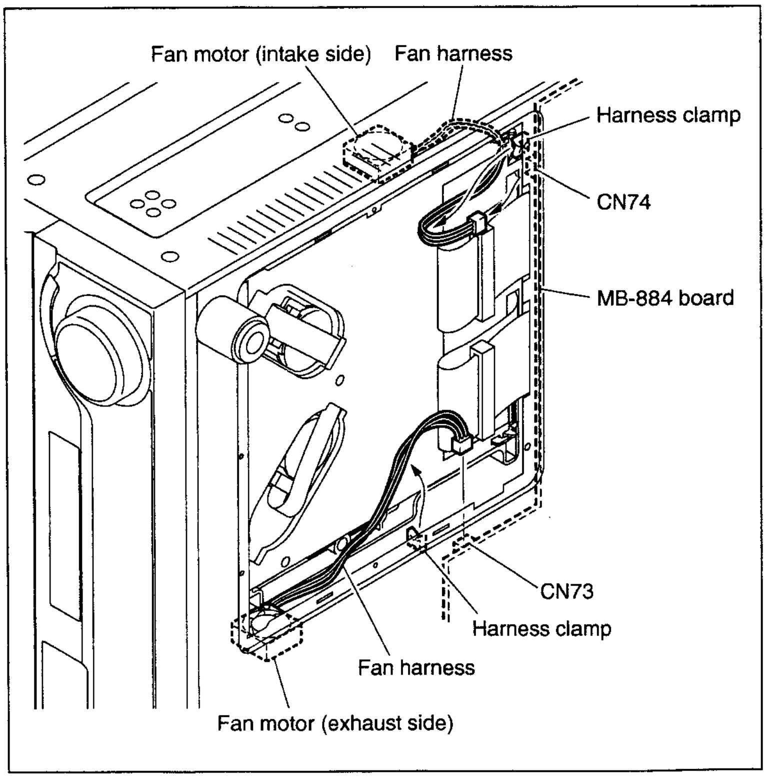
1. Turn the power off, then disconnect the power cord.
2. Remove the bottom plate. (Refer to Section 1-3-2.)

Replacement

1. Disconnecting the Fan Harness

(1) Disconnect the fan harness from the connectors CN73 and CN74 on the MB-884 board.
- CN73: Exhaust side fan motor
- CN74: Intake side fan motor

(2) Remove the harness clamp from the fan harness.


Fan motor (intake side)
Fan harness
Harness clamp
CN74
MB-884 board
CN73
Harness clamp
Fan harness
Fan motor (exhaust side)

Disconnect the Harness

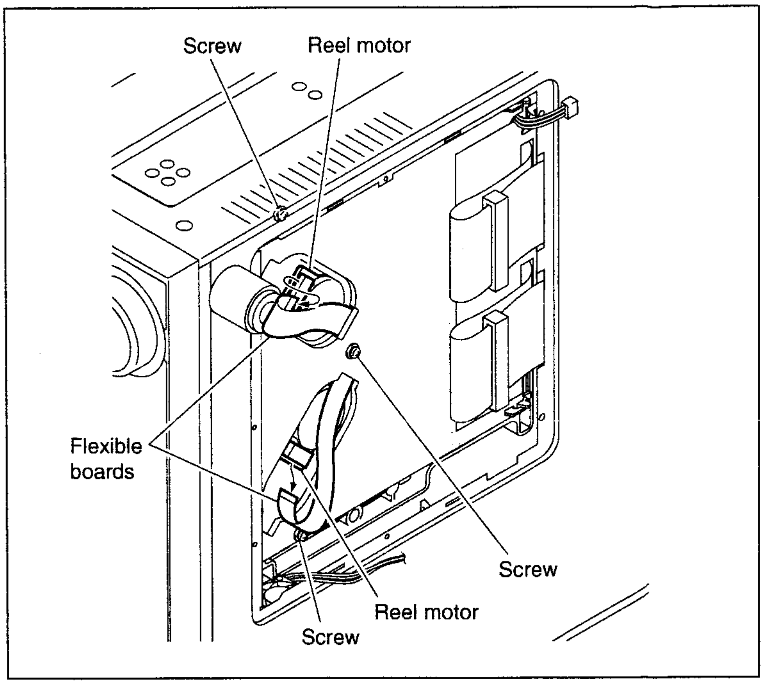
2. Opening the DR-414/508 Board

(1) Disconnect the flexible boards from the connectors on the reel motors.

Note

Setting the reel tables at the S cassette position will ease the operation.
(Refer to Section 5-1-3.)

(2) Fully loosen the three screws on the DR-414/508 board.

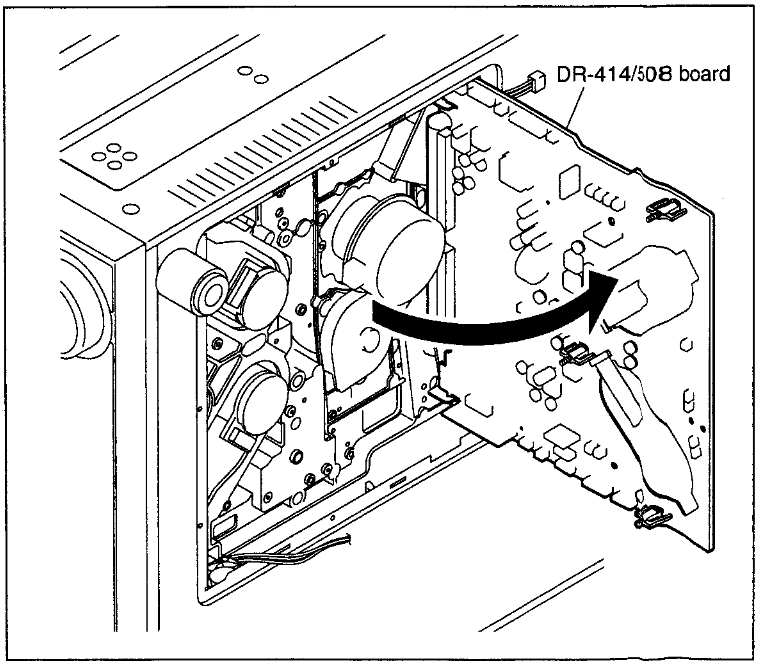

Screw
Reel motor
Flexible boards
Screw
Reel motor
Screw

Disconnect the Flexible Boards

(3) Open the DR-414/508 board in the arrow direction.

Note

Open the board slowly so that excessive force is not applied to the connected harnesses.


DR-414/508 board

Open the DR-414/508 Board

3. Removing the Fan Motor

(1) For the intake fan motor, take out the fan harness.

(2) Remove the one screw to remove the fan motor.

4. Attaching the Fan Motor

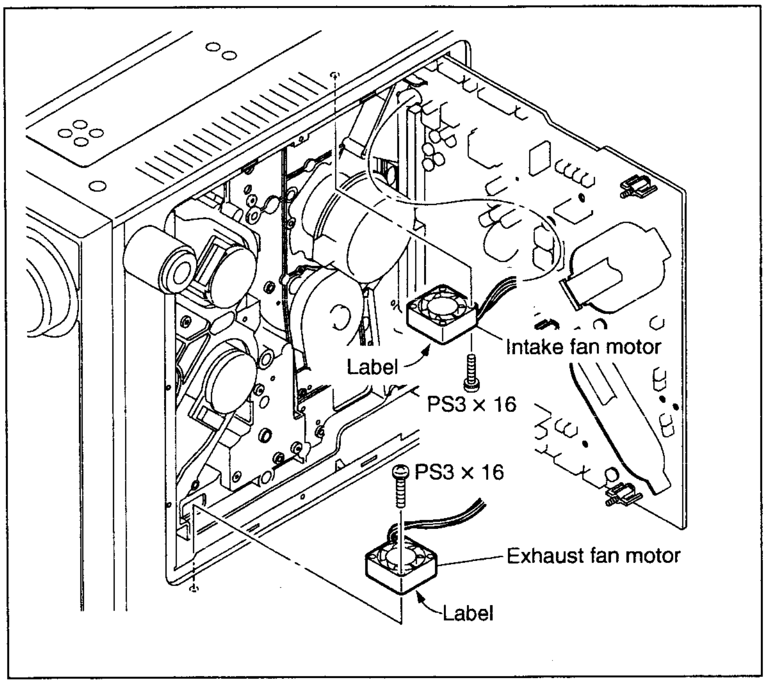
(1) Attach a new fan motor in the direction as shown in the figure, then fix it with one screw.

Tightening torque: 78.4×10^{-2} N•m {8.0 kgf•cm}

Note

Pay attention not to mistake the direction of the labeled side and the harness direction.

(2) For the intake fan motor, put the fan harness into the part shown in the figure.



Remove/Attach the Fan Motor

5. Closing the DR-414/508 Board

(1) Turn the gear of the reel shift motor to move the reel table at the middle position between the S and L cassette positions. (Refer to Section 5-1-3.)

Note

Be careful not to close the DR-414/508 board while the reel table is left at the S or L cassette position. Or the reel position sensor may damage.

(2) Arrange the harnesses connected to the DR-414/508 board, then close the DR-414/508 board.

Notes

- Match the positioning hole of the DR-414/508 board with the positioning boss.
- Be sure not to be caught the harness at the hinge portion.

(3) Tighten the three screws on the DR-414/508 board.

(4) Reconnect the flexible boards that has been disconnected in step 2 to the connectors on the reel motors.

CAUTION

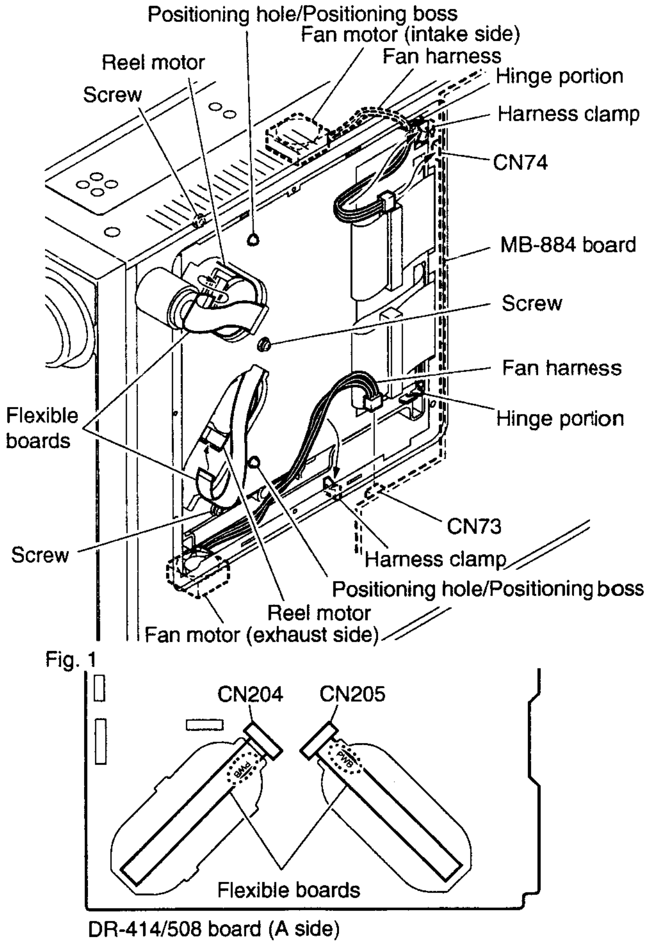
The connecting direction of the flexible board is specified. When disconnecting the flexible boards from both reel motor and DR-414/508 board, be sure to connect them so that the character “PWB” on the flexible boards are shown at the connector sides of the DR-414/508 board. (Fig. 1.) If opposite side is connected, the DR-414/508 board will fail.

6. Connecting the Harness

(1) Connect the fan harness to the connectors CN73 and CN74 on the MB-884 board.

- CN73: Exhaust side fan motor
- CN74: Intake side fan motor

(2) Hook the harness to the harness clamp.


Positioning hole/Positioning boss
Fan motor (intake side)
Reel motor
Fan harness
Screw
Hinge portion
Harness clamp
CN74
MB-884 board
Screw
Fan harness
Flexible boards
Hinge portion
CN73
Screw
Harness clamp
Positioning hole/Positioning boss
Reel motor
Fan motor (exhaust side)
Fig. 1
CN204
CN205
PWB
PWB
Flexible boards
DR-414/508 board (A side)

Connect the Fan Harness and Flexible Boards

5-26. Power Supply Unit Replacement

Outline

Replacement

1. Removing the Power Supply Unit
2. Checking the Power Supply Output Voltage (Refer to Section 8-2.)
3. Attaching the Power Supply Unit

Preparation

1. Turn the power off and wait more than 30 seconds.
2. Disconnect the power cord from the outlet.
3. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)

Replacement

1. Removing the Power Supply Unit

(1) Remove the harness from the connector of the power supply unit.

(2) Remove the two screws securing the power supply unit.

(3) Lift up the portion A of the power supply unit with a screw driver to disconnect the connector on the MB-884 board as shown in the figure.

(4) Remove the power supply unit from the chassis.

2. Checking the Power Supply Output Voltage

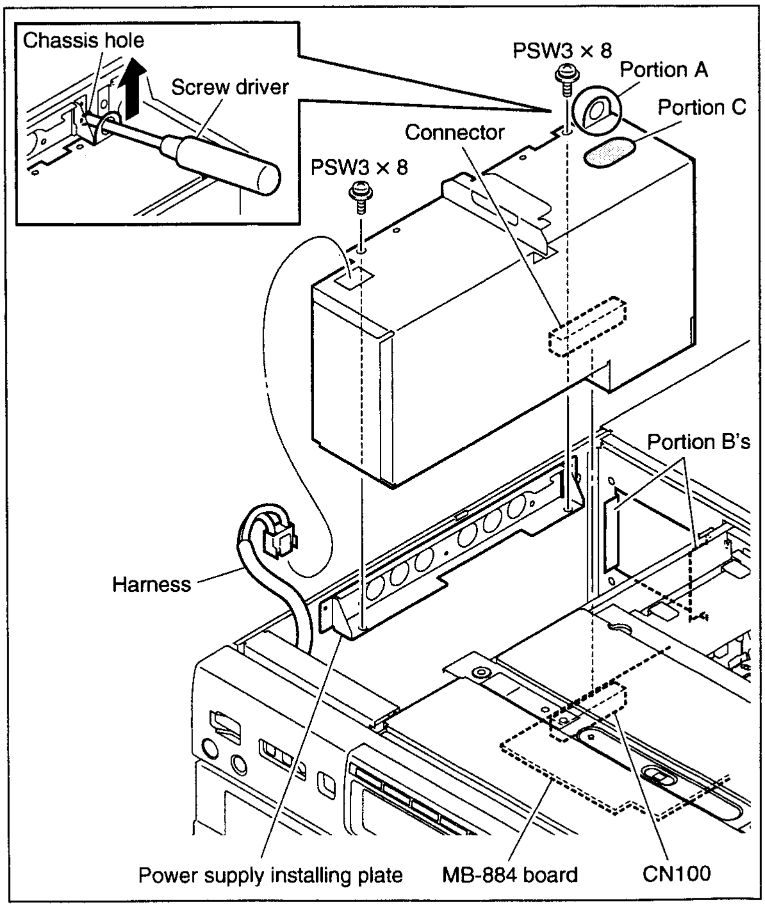
(Refer to Section 8-2.)

3. Attaching the Power Unit

(1) Put in the power supply unit along the portion B's of the chassis, then insert the connector at the bottom of the power unit to the connector CN100 on the MB-884 board.

(2) Press the portion C of the power supply unit to make a secure connection to the connector CN100 on the MB-884 board.

(3) Fix the power supply unit to the power supply installing plate with two screws.
Tightening torque: 140×10^{-2} N•m
{14.0 kgf•cm}



Remove/Attach the Power Supply Unit

5-27. Mounted Board Replacement

The replacing method about mounting board other than plug-in board is described here. As to replacement of the plug-in board, refer to the section 1-12.

5-27-1. AE-31 Board

Note

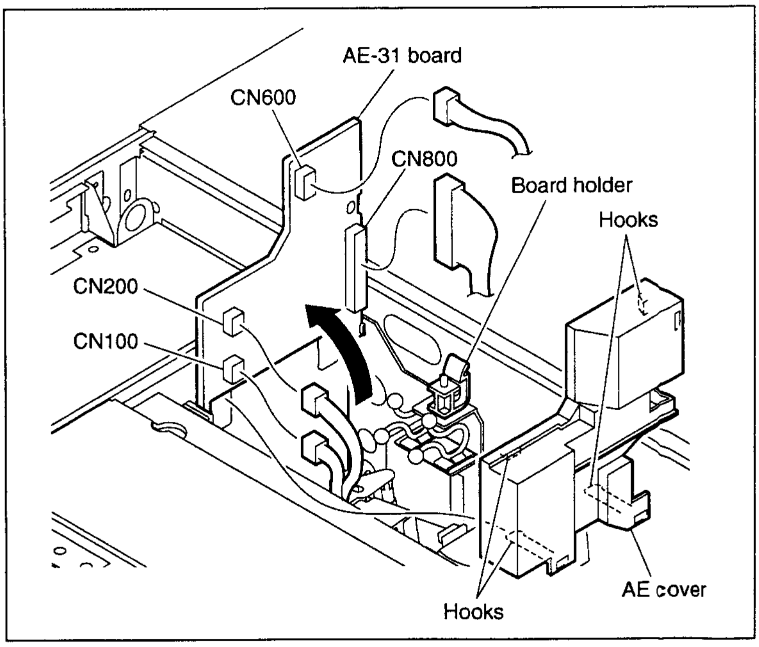
This board is not used in MSW-2000.

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
3. Unlock the board holder, and open the AE-31 board in the arrow direction.
4. Release the four hooks and then remove the AE cover from the AE-31 board.
5. Disconnect the four harnesses from the connectors CN100, CN200, CN600, and CN800.

   Note

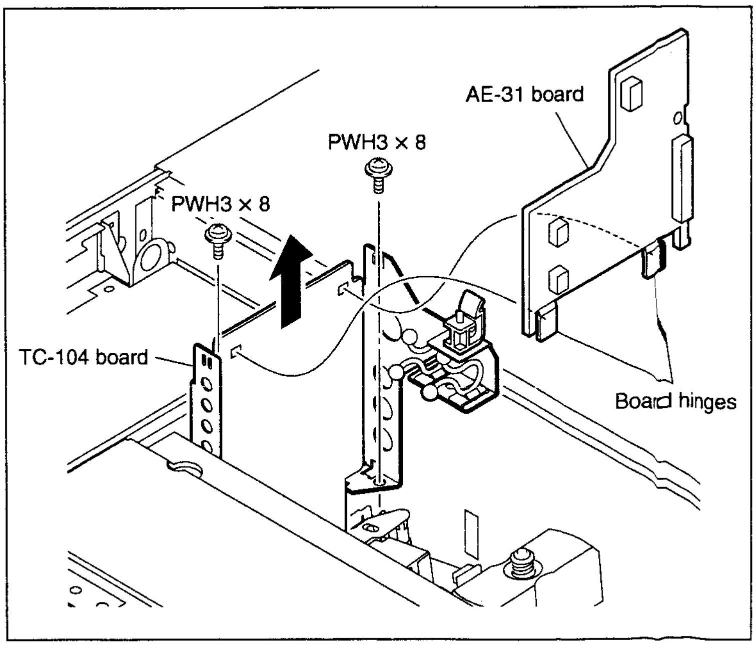
   When handling the harnesses connected to the AT head assembly (CN100, CN200 and CN600), be sure not to apply the force to the AT head assembly. If the force is applied, perform the confirmation of the tape running at drum exit side. (Refer to Section 6-7-2.)



Remove the AE-31 Board (1)

6. Remove the two screws securing the TC-104 board.
7. Pull out the TC-104 board with the AE-31 board in the arrow direction (approx. 3 centimeters.)
8. Remove the board hinges of the AE-31 board from the TC-104 board.

9. Perform the installation in the reverse order from steps 3 through 8.



Remove the AE-31 Board (2)

Steps after Replacement

10. Perform the following adjustments for respective models.

    HDW-2000/D2000, DVW-2000:
    CUE system adjustment (Refer to 8-5-7 and 8-5-8.)

    HDW-M2000/M2000P/S2000/M2100/M2100P, DVW-M2000/M2000P, MSW-M:
    LAU/CUE playback system adjustment (Refer to 8-5-5 and 8-5-7.)

    MSW-A2000:
    LAU playback system adjustment (Refer to 8-5-5.)

5-27-2. AU-272 Board

Note

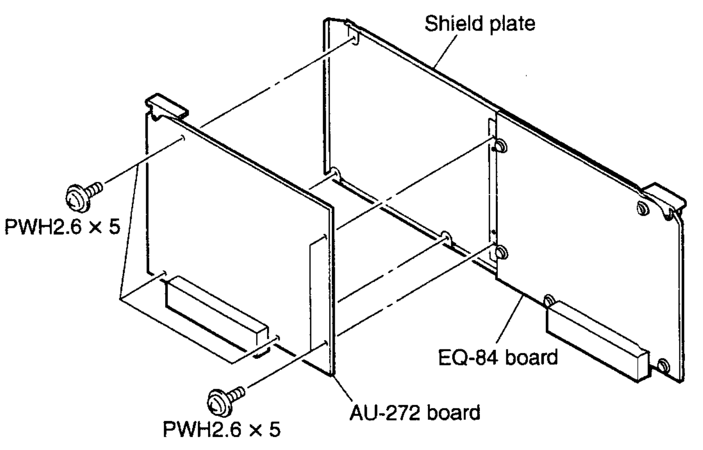
This board is not used in HDW-2000/D2000, DVW-2000/P and MSW-2000.

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly, and remove the AU-272 board with EQ-84 board. (Refer to Section 1-12.)
3. Remove the five screws and remove the AU-272 board from the shield plate.
4. Perform the installation in the reverse order from steps 2 and 3.

Steps after Replacement

5. Perform the LAU/AFM playback system adjustment. (Refer to Section 8-5-5 and Section 8-5-6.)



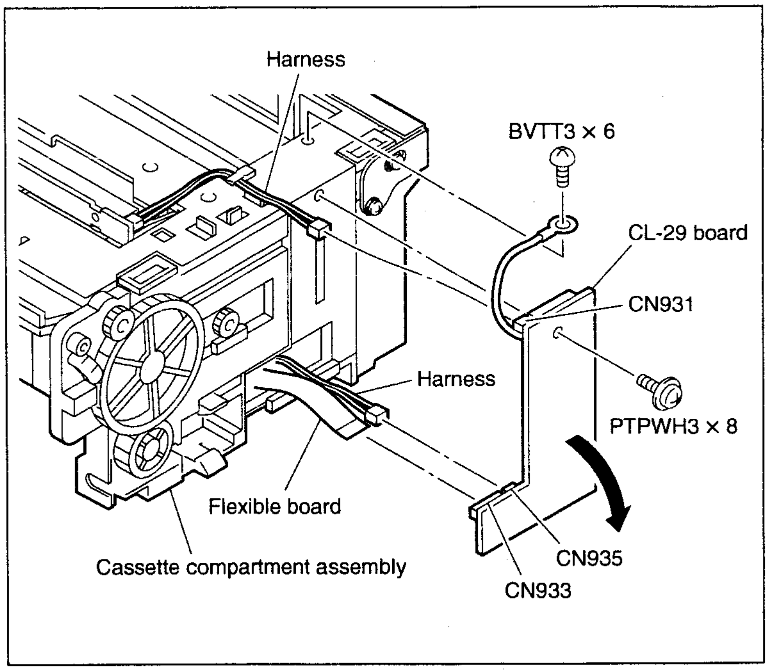
Remove the AU-272 Board

5-27-3. CL-29 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the cassette compartment assembly. (Refer to Section 1-5.)
3. Disconnect the harness from the connector CN931 on the CL-29 board.
4. Remove the two screws to remove the CL-29 board from the cassette compartment assembly, and then open the arrow direction.
5. Disconnect the flexible board from the connector CN933 on the CL-29 board.
6. Disconnect the harness from the connector CN935 on the CL-29 board.

7. Perform the installation in the reverse order from steps 2 through 6.


Harness
BVTT3 x 6
CL-29 board
CN931
Harness
PTPWH3 x 8
Flexible board
Cassette compartment assembly
CN935
CN933

Remove the CL-29 Board

Steps after Replacement

8. Confirm that the compartment part of the cassette compartment assembly moves up and down normally by C013 : CASSETTE COMP. (Refer to Section 3-2-2.)

5-27-4. CP-350 Board

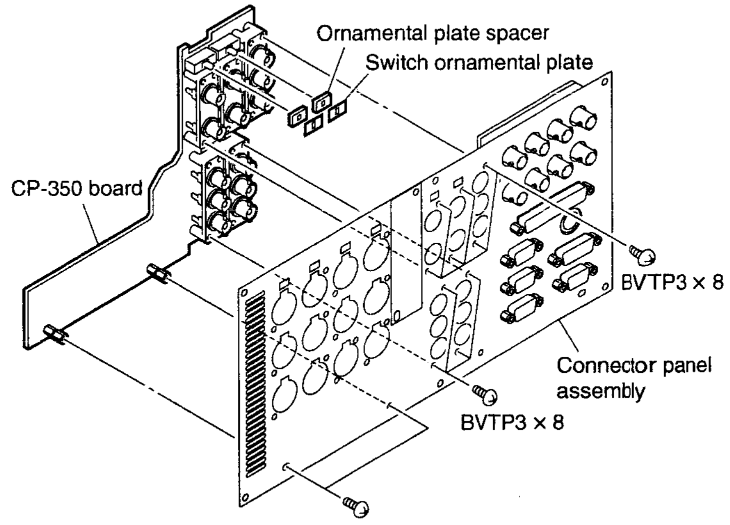
Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the connector panel assembly. (Refer to Section 1-4.)
3. Remove the CP-351 board. (Refer to Section 5-27-5.)
4. Remove the two screws (BVTT3 × 6).
5. Remove all the screws (BVTT3 × 8) fixing the BNC connectors and remove the CP-350 board.

   Note

   - Be careful not to loose the SW ornamental plates and the ornamental plate spacers at this time.
     There are two sets for MSW series (recorder) and one set for other model.
   - Remove the ten screws for MSW series (recorder) and the six screws for other model.

6. Perform the removal in the reverse order from steps 2 through 5.


Ornamental plate spacer
Switch ornamental plate
CP-350 board
BVTP3 x 8
Connector panel assembly
BVTP3 x 8
BVTT3 x 6

This figure shows the MSW-A2000.

Remove the CP-350 Board

Steps after Replacement

7. Check if the component video output signal and composite video output signal are normally output. (Refer to Section 1-25-6.)

5-27-5. CP-351 Board

Note

Provide the following screws for the screws marked with asterisks in the illustration to replace the CP-351 board of part No. suffix -A with one of suffix -B or later.
BVTP3 x 10 (Part No. 7-685-647-79)

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the connector panel assembly. (Refer to Section 1-4.)
3. Remove all the screws fixing the XLR connectors.

   Note

   Remove the following number of screws.

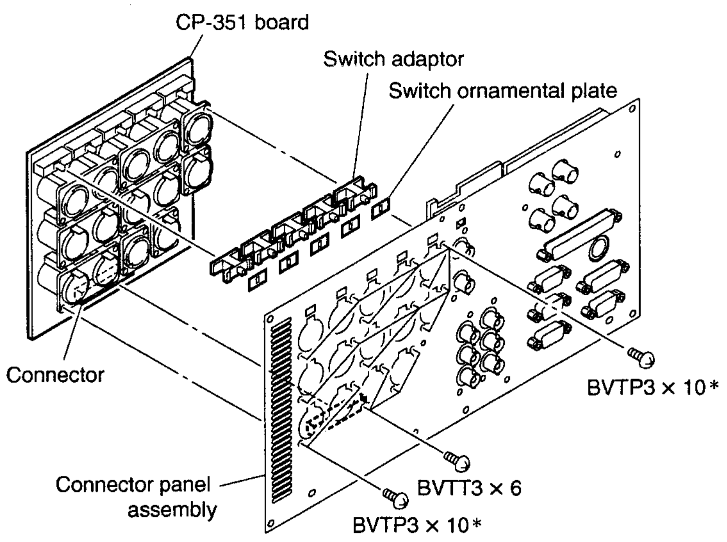
HDW-2000, D2000, M2000/P :	18 pcs
HDW-M2100/P :	10 pcs
HDW-S2000/P :	18 pcs
DVW-2000/P, M2000/P :	18 pcs
MSW-2000 :	18 pcs
MSW-A2000/P :	14 pcs
MSW-M2000/P, M2000E/P :	16 pcs
MSW-M2100/P, M2100E/P :	10 pcs

4. Remove the CP-351 board by disconnect the connector from the CP-350 board.

   Note

   For recorder only, be careful not to loose the SW ornamental plates and the switch adaptors at this time.

5. Perform the installation in the reverse order from steps 2 through 4.



This figure shows the HDW-2000.

*: BVTT3 x 6 for the CP-351 board of suffix -A

Remove the CP-351 Board

Steps after Replacement

6. Check the input/output level of each analog audio. (Refer to Section 1-25-7.)

5-27-6. CP-371 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the connector panel assembly. (Refer to Section 1-4.)
3. Remove the four screws and ten screws for connectors to remove the CP-371 board.

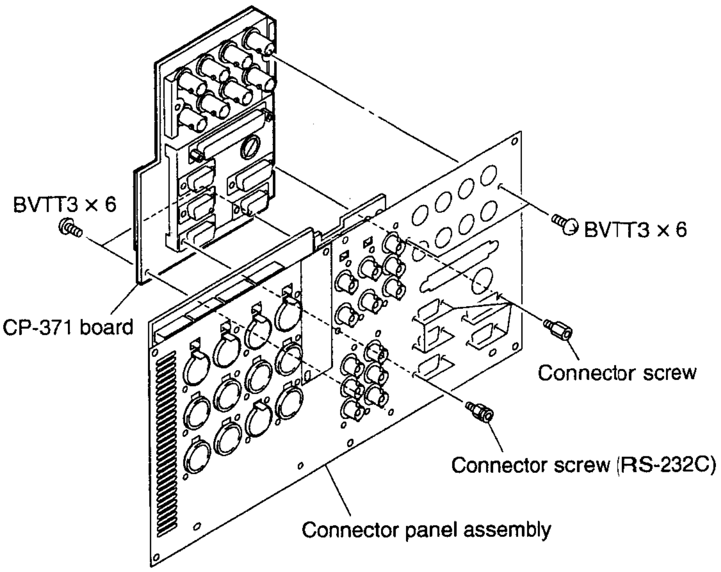
   Notes

   - Be careful not to mistake the fixing screws for RS-232C since these only are different from other connector fixing screws.
   - It is not required to remove the fixing screws for the REMOTE-2 connector.

4. Perform the attachment in the reverse order from steps 2 through 3.

Steps after Replacement

5. Check the input/output level of the AES/EBU channel. (Refer to Section 1-25-8.)
6. Execute A7 : VIDEO REMOTE (15P) in the maintenance mode. (Refer to Section 3-3-8.)


BVTT3 x 6
CP-371 board
BVTT3 x 6
Connector screw
Connector screw (RS-232C)
Connector panel assembly

This figure shows the MSW-A2000.

Remove the CP-371 Board

5-27-7. CUE-13 Board

Note

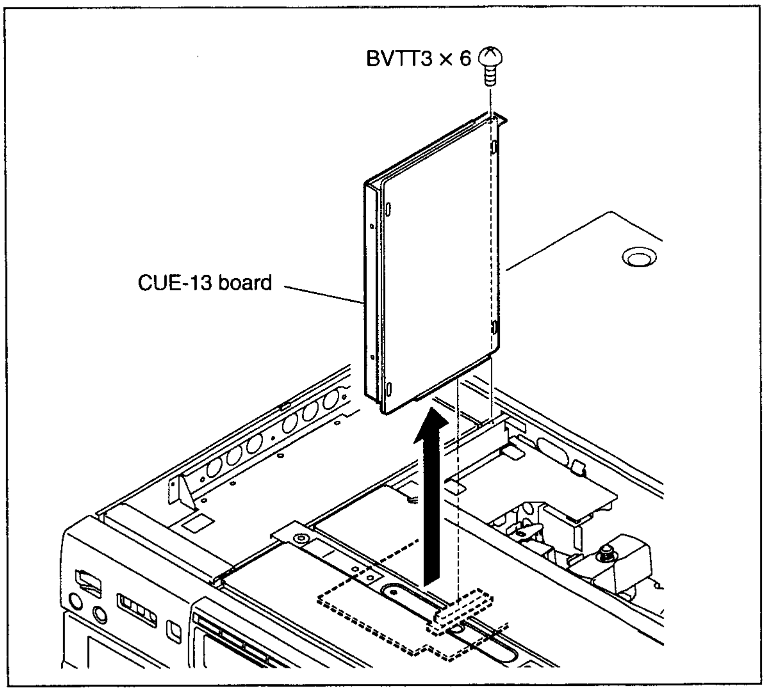
This board is not used in MSW-2000/A2000/A2000P.

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
3. Remove one screw and remove the CUE-13 board in the arrow direction.
4. Perform the installation in the reverse order from steps 2, 3.

Steps after Replacement

5. Perform the CUE line adjustment. (Refer to Sections 8-5-7 and 8-5-8.)

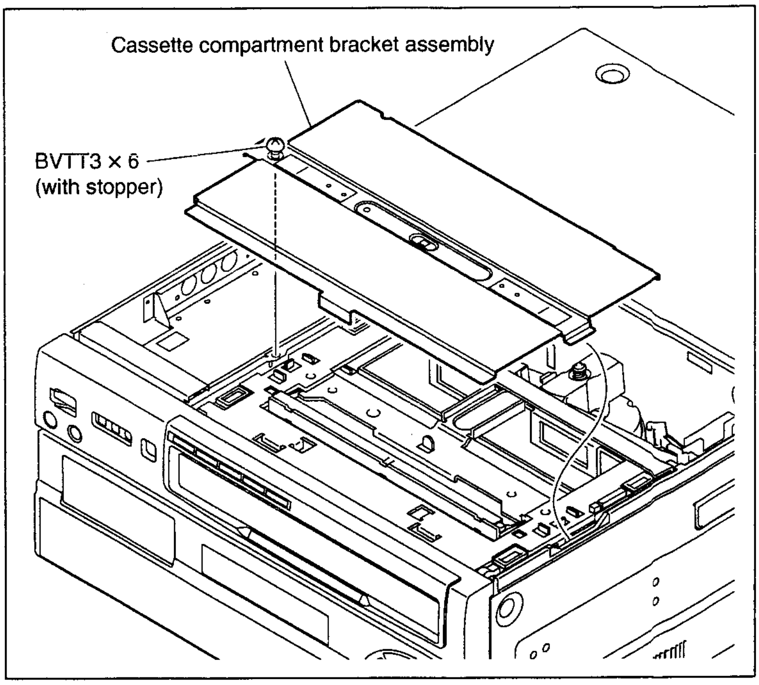


Remove the CUE-13 Board

5-27-8. DIO-65 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
3. Fully loosen one screw and remove the cassette compartment bracket assembly.
4. Remove the power supply unit. (Refer to Section 5-26.)


Cassette compartment bracket assembly
BVTT3 x 6
(with stopper)

Remove the Cassette Compartment Bracket Assembly

5. Disconnect the flexble card wire from the connector CN1 on the DIO-65 board.
6. Disconnect the connection between the HP-101 and FP-133 boards, then remove the DIO-65 board in the arrow direction.

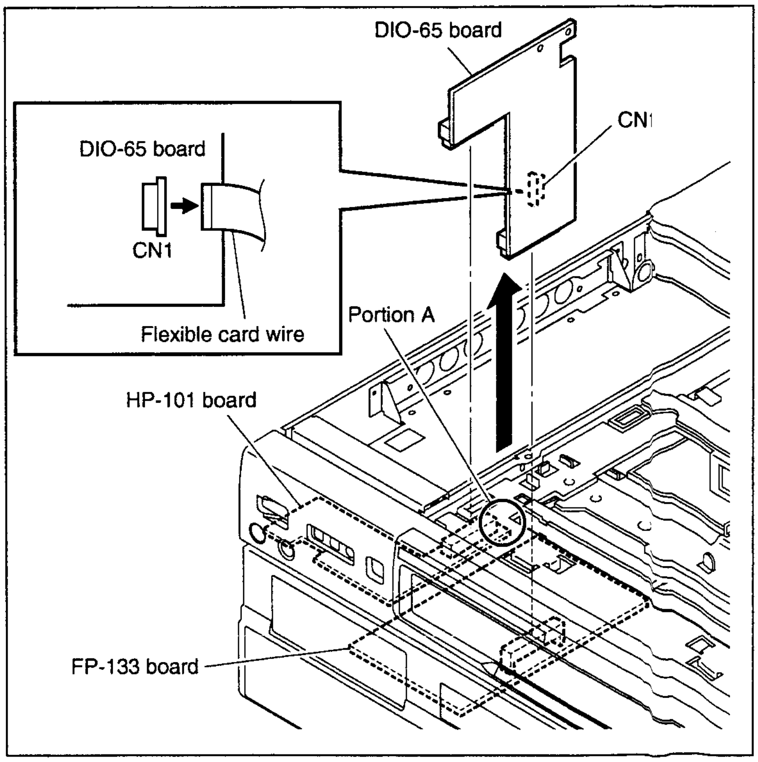
   Note

   For recorder only, be careful when removing or installing the DIO-65 board, support the portion A of the HP-101 board with fingers so that excessive force is not applied to the HP-101 board.

7. Perform the installation in the reverse order from steps 2 through 6.

Steps after Replacement

8. Perform the Tele-File system adjustment. (Refer to Section 8-11.)


DIO-65 board
CN1
DIO-65 board
CN1
Flexible card wire
Portion A
HP-101 board
FP-133 board

Remove the DIO-65 Board

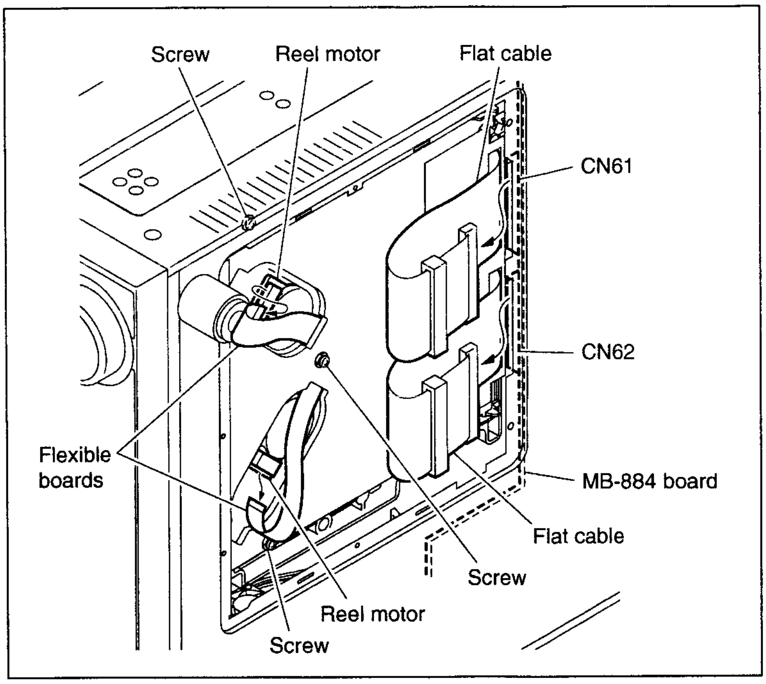
5-27-9. DR-414/508 Board

Removal

1. Turn the power off and disconnect the power cord.
2. Place the unit with its one side down and remove the bottom plate.
   (Refer to Section 1-3-2.)
3. Disconnect the flat cables from the connectors CN61 and CN62 on the MB-884 board.
4. Disconnect the flexible boards from the connectors on the reel motors.

   Note

   Setting the reel tables at the S cassette position will ease the operation.
   (Refer to Section 5-1-4.)
5. Fully loosen the three screws on the DR-414/508 board.

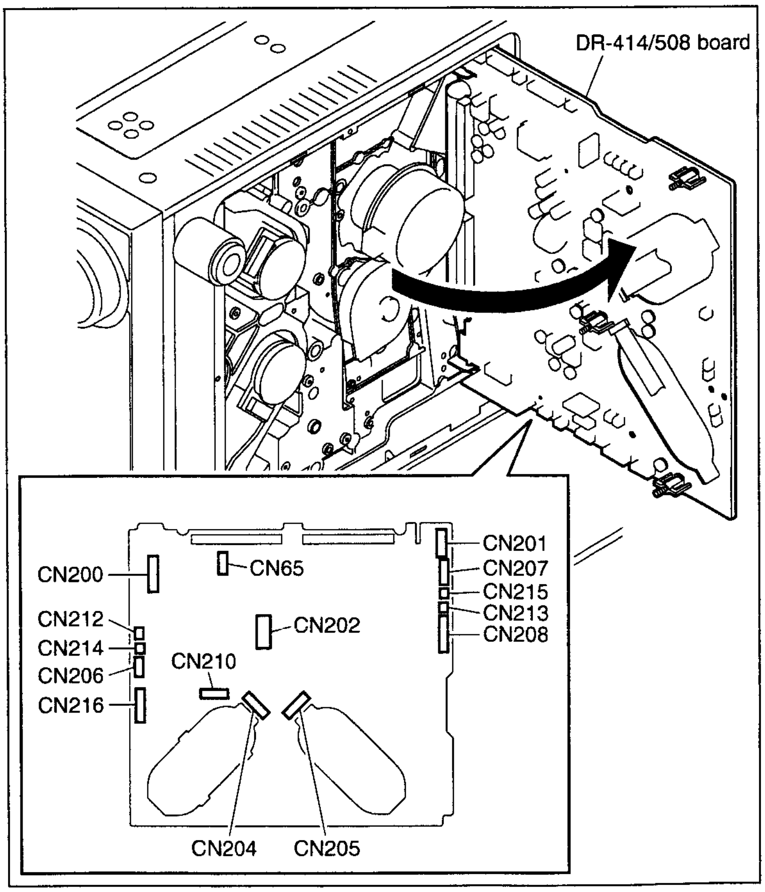

Screw
Reel motor
Flat cable
CN61
CN62
Flexible boards
MB-884 board
Flat cable
Screw
Reel motor
Screw

Disconnect the Flat Cables and Flexible Boards

6. Open the DR-414/508 board in the arrow direction.

   Note

   Open the board slowly so that excessive force is not applied to the connected harness.
7. Disconnect all the harnesses and flexible boards connected from the connectors (CN65, 200 to 202, 204 to 208, 210, 212 to 216) on the DR-414/508 board.


DR-414/508 board
CN200
CN65
CN201
CN207
CN215
CN213
CN208
CN212
CN214
CN206
CN216
CN202
CN210
CN204
CN205

Disconnect the Harnesses

8. Remove the two screws and remove the DR-414/508 board.
9. Remove the bracket (A) from the DR-414/508 board.
10. Remove the insulating sheet from the DR-414/508 board.

Installation

11. Attach the bracket (A) to a new DR-414/508 board as shown in the figure.
12. Pass the two flat cables through the holes of the DR insulating sheet, and fit the DR insulating sheet into the connector on the DR-414/508 board.
13. Supporting the DR-414/508 board with a hand, match the two positioning bosses of the bracket (A) to the positioning holes on the MD base assembly and tighten with two screws.

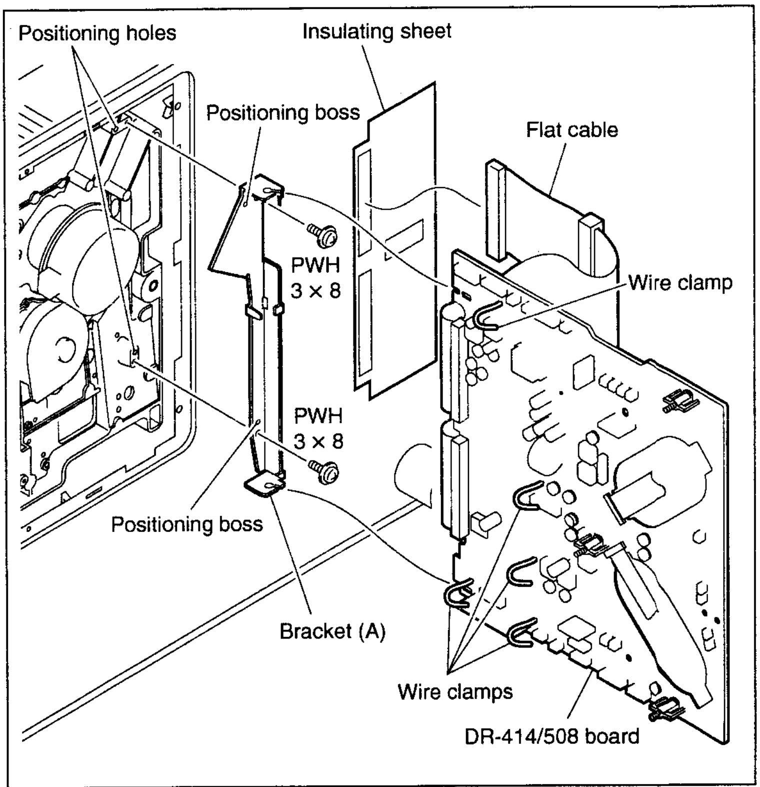
    Note

    Be careful not to put the harnesses between the bracket (A) and the MD base assembly.

14. Connect all the harnesses and flexible boards that have been disconnected in step 6.
15. Arrange the harnesses and fasten with wire clamps.
16. Turn the gear of the reel shift motor to move the reel table at the middle position between the S and L cassette positions.
    (Refer to Section 5-1-3.)

    Note

    Be careful not to close the DR-414/508 board while the reel tables are left at the S or L cassette position. Or the reel position sensor may damage.


Positioning holes
Insulating sheet
Positioning boss
Flat cable
PWH
3 x 8
Wire clamp
PWH
3 x 8
Positioning boss
Bracket (A)
Wire clamps
DR-414/508 board

Remove the DR-414/508 Board

17. Close the DR-414/508 board and tighten the three screws to fix it.
18. Connect the flexible boards that have been disconnected in step 4 to the connectors on the reel motors.

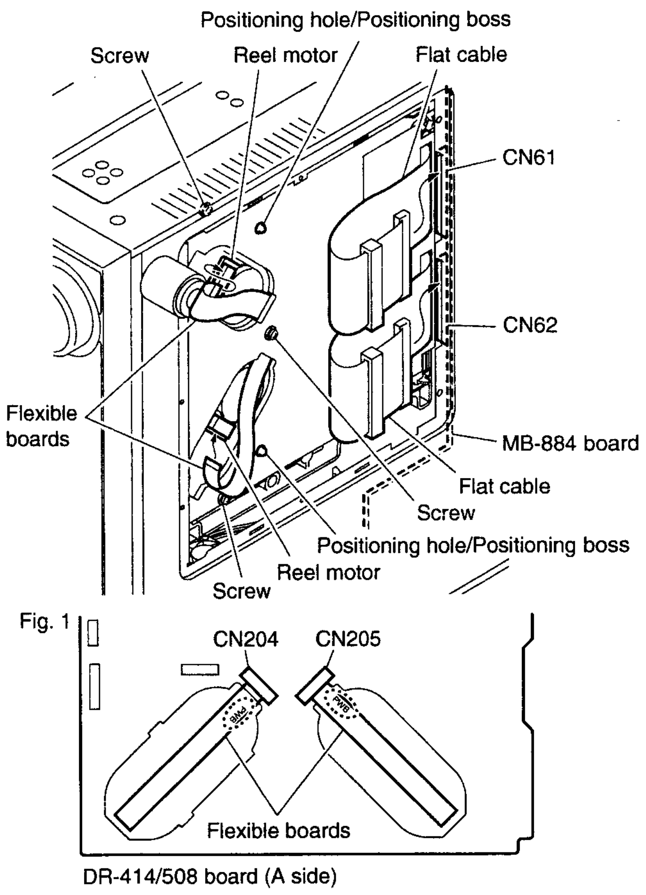
    CAUTION

    The connecting direction of the flexible board is specified. When disconnecting the flexible boards from both reel motor and DR-414/508 board, be sure to connect them so that the character "PWB" on the flexible boards are shown at the connector sides of the DR-414/508 board. (Fig. 1.) If connected opposite side, the DR-414/508 board will fail.

19. Connect the flat cables that have been removed in step 3 to the connectors CN61 and CN62 on the MB-884 board.
20. Reattach the bottom plate.
    (Refer to Section 1-3-2.)

Steps after Replacement

21. Perform the Servo/DT System Adjustment.
    (Refer to Section 8-3.)

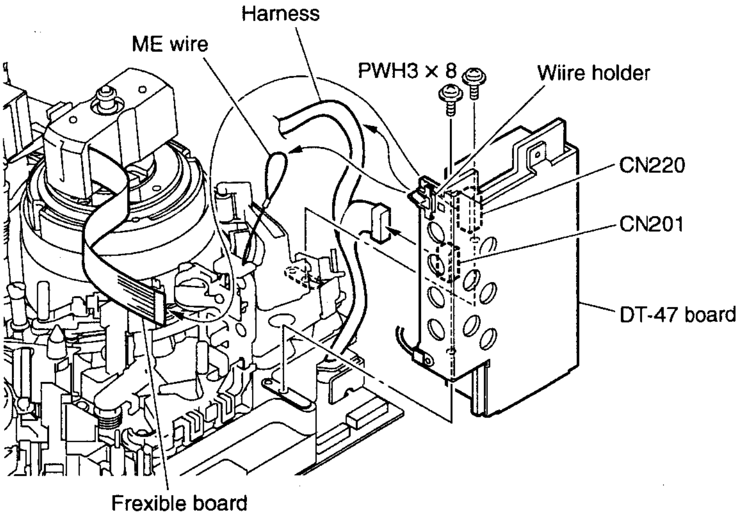

Positioning hole/Positioning boss
Screw
Reel motor
Flat cable
CN61
CN62
Flexible boards
MB-884 board
Flat cable
Screw
Positioning hole/Positioning boss
Reel motor
Screw
Fig. 1
CN204
CN205
PWB
PWB
Flexible boards
DR-414/508 board (A side)

Connect the Flat Cables and Flexible Boards

5-27-10. DT-47 Board

Removal

1. Turn the power off and disconnect the power cord.
2. Place the unit with its one side down to remove the bottom plate.
   (Refer to Section 1-3-2.)
3. Open the DR-414/508 board.
   (Refer to steps 4, 5 in Section 5-27-9.)
4. Disconnect the harness from the connector CN215 on the DR-414/508 board.
   (Refer to step 7 in Section 5-27-9.)
5. Disconnect the harness and the flexible board from the connectors CN200 and CN201 on the DT-47 board.
6. Remove the ME wire and harness from the wire holder.
7. Remove the two screws and remove the DT-47 board.



Remove the DT-47 Board

8. Perform the installation in the reverse order from steps 2 through 7.

Steps after Replacement

9. Perform the servo/DT system adjustment.
   (Refer to Section 8-3.)

5-27-11. EQ-84 Board

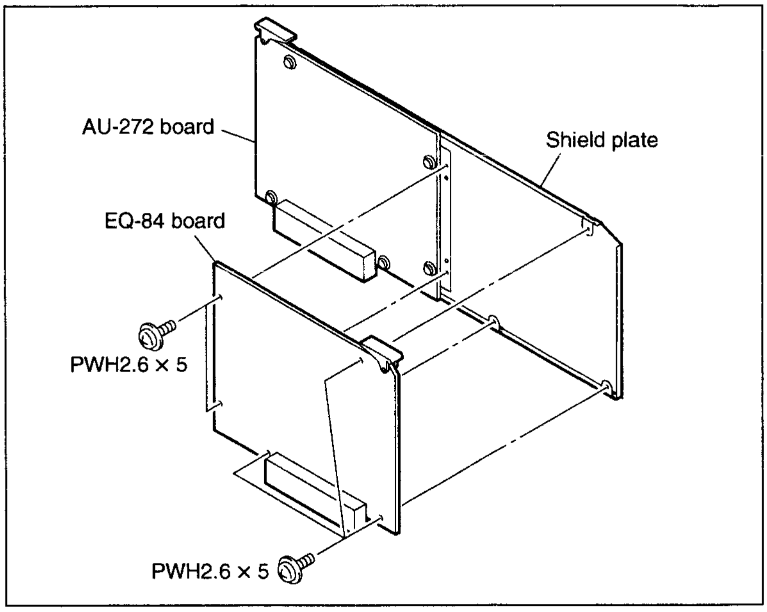
Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly, and remove the EQ-84 with AU-272 board. (Refer to Section 1-12.)
3. Remove the five screws and remove the EQ-84 board from the shield plate.

4. Perform the installation in the reverse order from steps 2 and 3.

Steps after Replacement

5. Perform the RF system alignment. (Refer to Section 8-4.)



Remove the EQ-84 Board

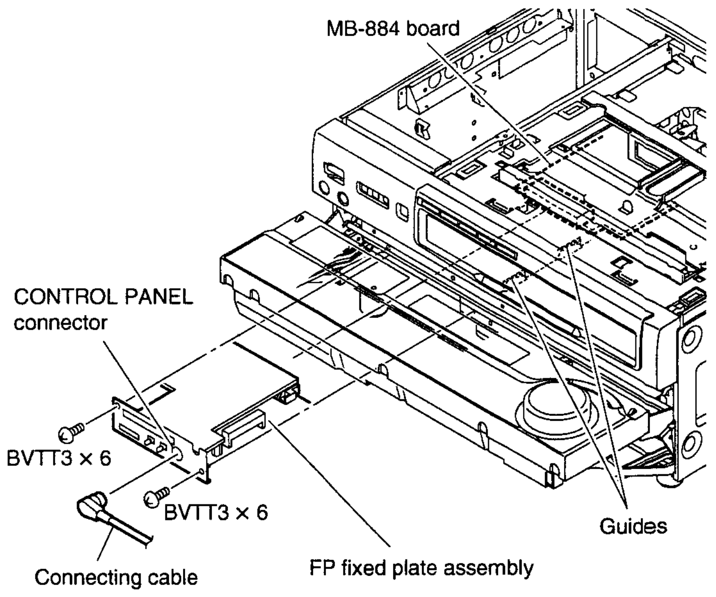
5-27-12. FP-133/134 Board

Note

The FP-134 board is not used in HDW-D2000/S2000/S2000P, DVW-2000/P, DVW-M2000/P and MSW-2000/M2000E/M2000EP/M2100E/M2100EP.

Removal

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the power supply unit. (Refer to Section 5-26.)
4. Disconnect the DIO-65 board. (Refer to Section 5-27-8.)
5. Open the lower control panel. (Refer to Section 1-6.)
6. Disconnect the connecting cable of the control panel from the CONTROL PANEL connector.
7. Remove the two screws fixing the FP fixed plate assembly.
8. Disconnect the connector on the MB-884 board to pull out the FP fixed plate assembly from the chassis.


MB-884 board
CONTROL PANEL connector
BVTT3 x 6
BVTT3 x 6
Guides
Connecting cable
FP fixed plate assembly

Remove the FP Fixed Plate Assembly

9. Remove the two screws (A) to remove the FP-134 board.

   Notes

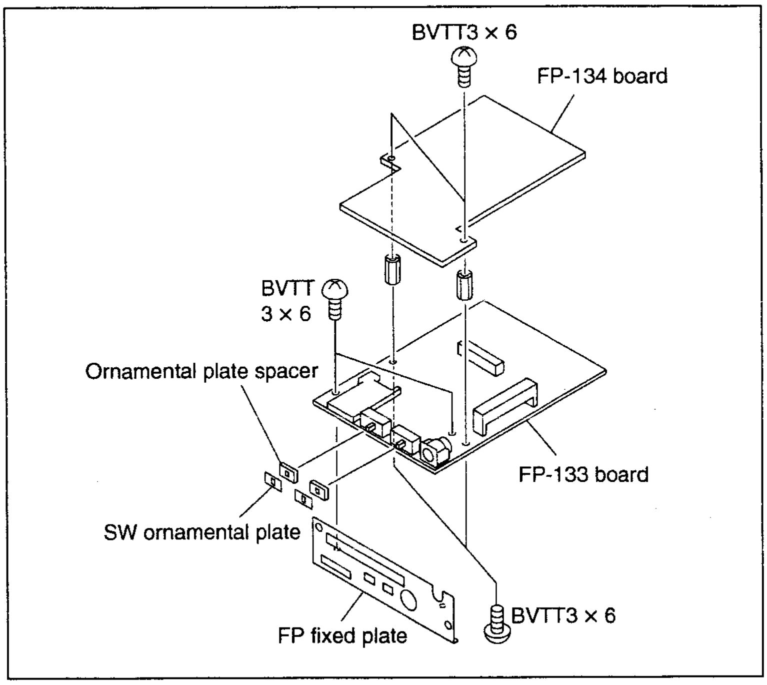
   - Be careful not to loose the SW ornamental plates and the ornamental plate spacers at this time.
   - In the case of HDW-D2000/S2000/S2000P, DVW-2000/P, DVW-M2000/P or MSW-2000/M2000E/M2000EP/M2100E/M2100EP, skip this step because the FP-134 board is not mounted.

10. Remove the four screws (B) to remove the FP bracket and the FP fixed plate.

11. Perform the installation in the reverse order from steps 2 through 10.

    Note

    Be sure to insert the FP-133 board along the chassis guides when attaching the FP fixed plate assembly.


BVTT3 x 6
FP-134 board
BVTT
3 x 6
Ornamental plate spacer
FP-133 board
SW ornamental plate
BVTT3 x 6
FP fixed plate

Remove the FP-133/134 Board

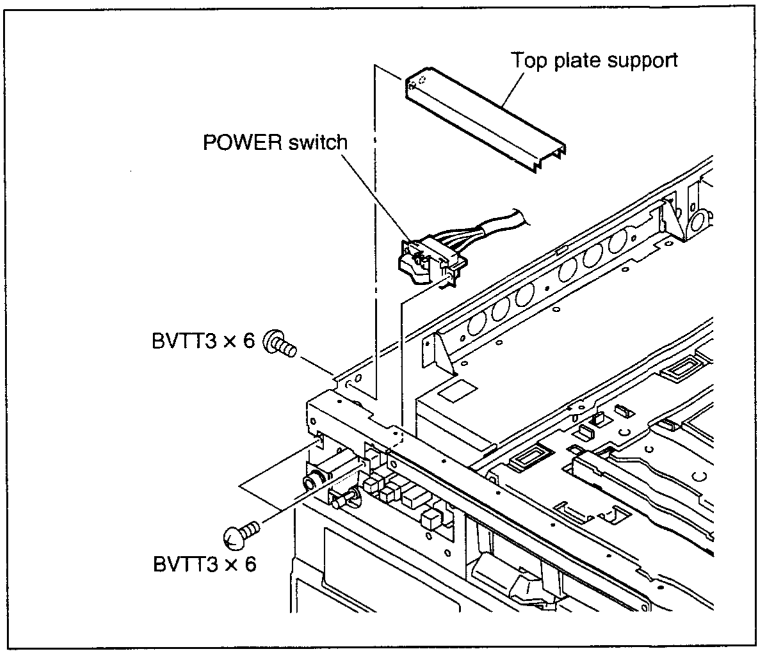
Steps after Replacement

12. After replacing the FP-133 and FP-134 boards, check the operation of the boards by referring to Sections 1-25-21 and 1-25-22.

5-27-13. HP-101 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (front) assembly. (Refer to Section 1-3-1.)
3. Remove the front panel. (Refer to Section 1-3-3.)
4. Remove the DIO-65 board. (Refer to Section 5-27-8.)
5. Remove the one screw to remove the top plate support.
6. Remove the two screws and remove the POWER switch.

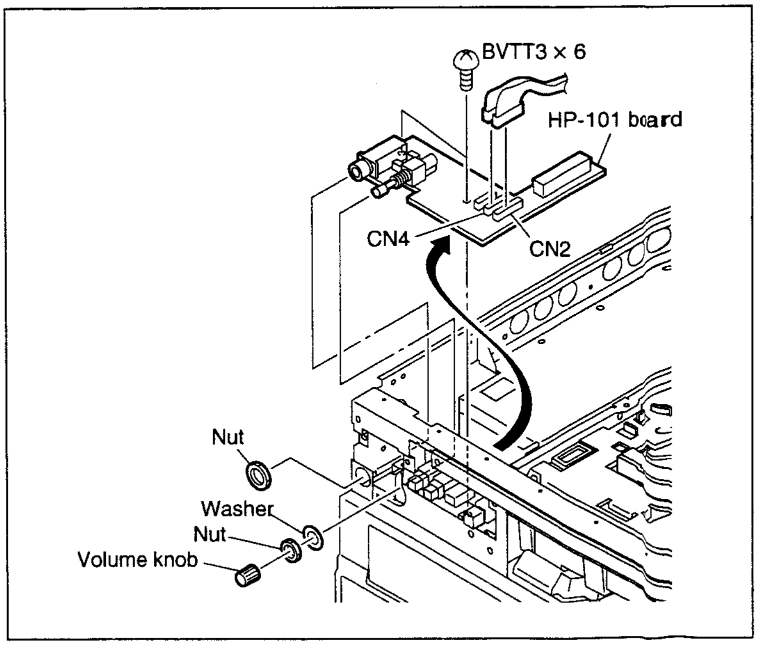

Top plate support
POWER switch
BVTT3 x 6
BVTT3 x 6

Remove the Top Plate Support and POWER Switch

7. Disconnect the harnesses from the connectors CN2 and CN4 on the HP-101 board.
8. Remove the volume knob and the nuts (headphone volume and headphone jack.)
9. Remove the two screws and remove the HP-101 board.
10. Perform the installation in the reverse order from steps 2 through 9.

Steps after Replacement

11. Be sure to check if the headphone volume functions. (Refer to Section 1-25-25.)


BVTT3 x 6
HP-101 board
CN4
CN2
Nut
Washer
Nut
Volume knob

Remove the HP-101 Board

5-27-14. LED-357 Board

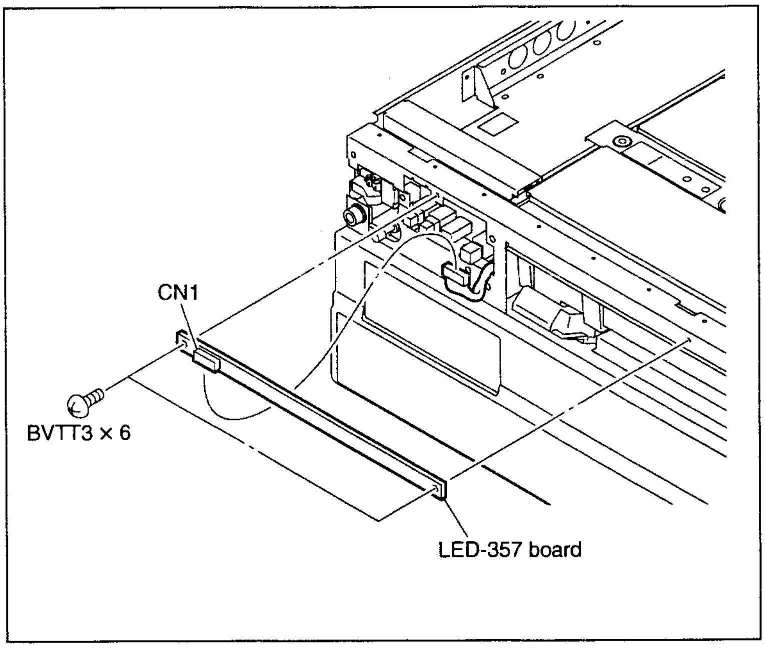
Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the front panel assembly. (Refer to Section 1-3-3.)
3. Disconnect the harness from the connector CN1 on the LED-357 board.
4. Remove the two screws and remove the LED-357 board.

5. Perform the installation in the reverse order from steps 2 and 4.

Steps after Replacement

6. Confirm that the corresponding format lamp indicator will light up when the cassette tape recorded in each format is inserted.



Remove the LED-357 Board

5-27-15. SWC-40 Board

Note

The SWC-40 board is not used in MSW-M2000E/P, M2100E/P.

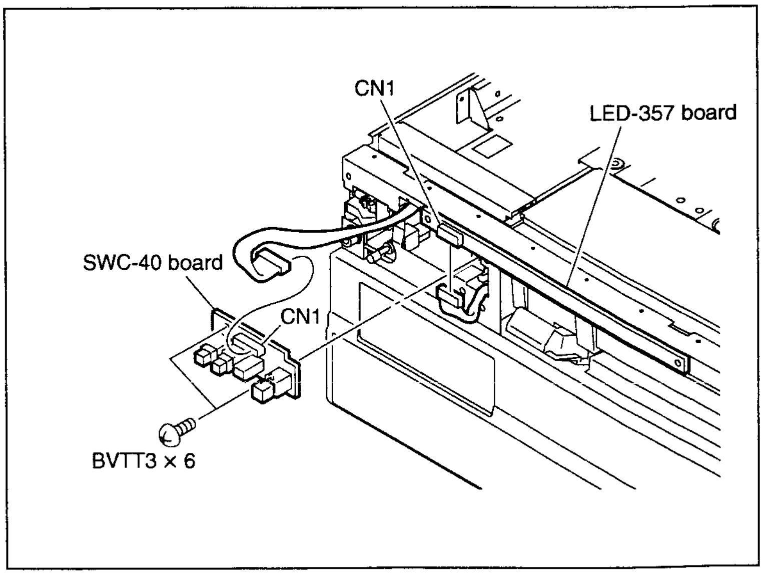
Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the front panel assembly. (Refer to Section 1-3-3.)
3. Disconnect the harness from the connector CN1 on the LED-357 board.
4. Remove the two screws and remove the SWC-40 board.
5. Disconnect the harness from the connector CN1 on the SWC-40 board.

6. Perform the installation in the reverse order from steps 2 and 5.

Steps after Replacement

7. Confirm that the switches and indicators function normally.

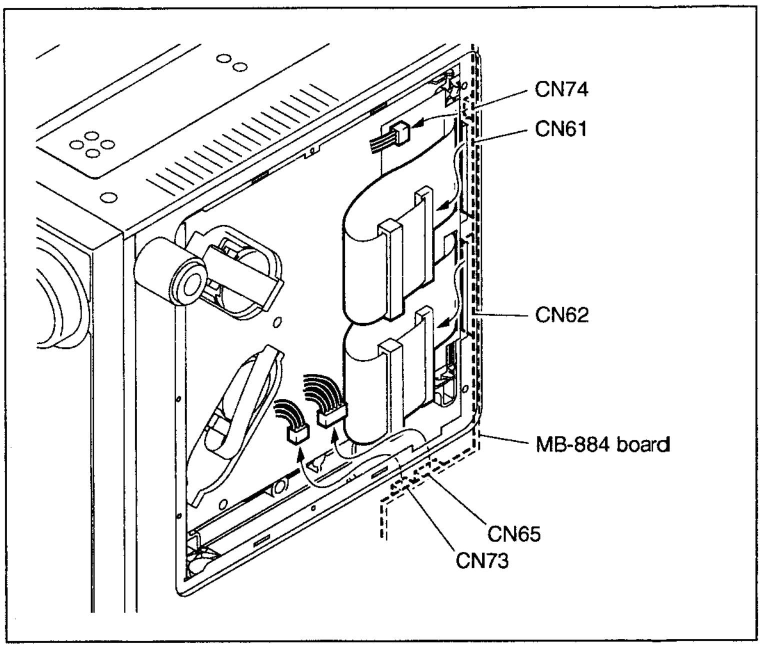


Remove the SWC-40 Board

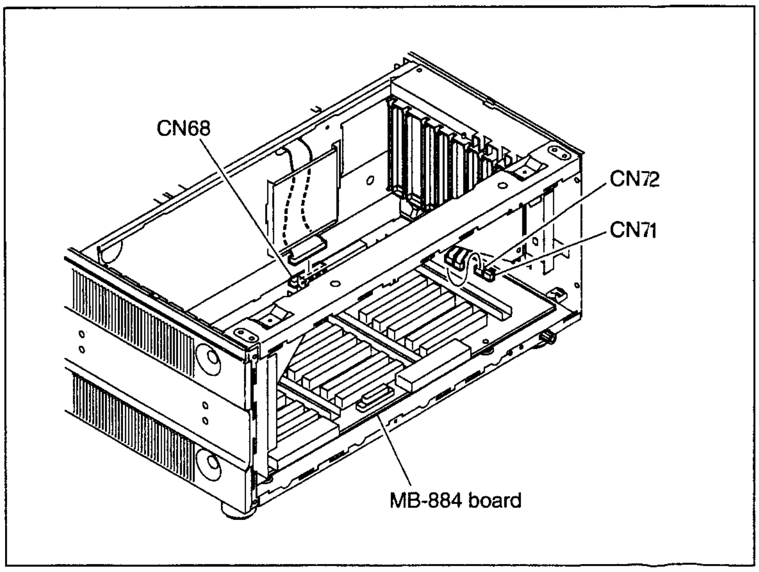
5-27-16. MB-884 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Place the unit with its one side down to remove the bottom plate.
   (Refer to Section 1-3-2.)
3. Disconnect the flat cables and harnesses from the connectors CN61, CN62, CN65, CN73, and CN74 on the MB-884 Board.
4. Reattach the bottom plate temporarily.
5. Restore the unit to the original position.
6. Remove the upper lid (front) assembly and upper lid (rear) assembly.
   (Refer to Section 1-3-1.)
7. Remove the power supply unit.
   (Refer to step 1 in section 5-26.)
8. Remove all the plug-in boards.
   (Refer to Section 1-12.)
9. Remove the connector panel assembly.
   (Refer to Section 1-4.)
10. Remove the AC panel assembly.
    (Refer to Section 1-3-4.)
11. Disconnect the harnesses from the connectors CN68, CN71, and CN72 on the MB-884 board.

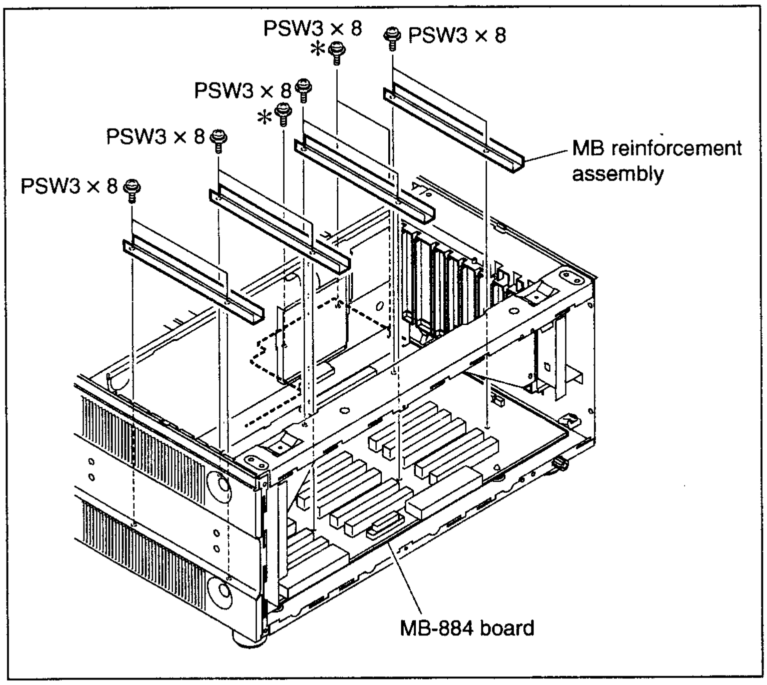


Disconnect the Flat Cables and Harnesses (1)



Disconnect the Harnesses (2)

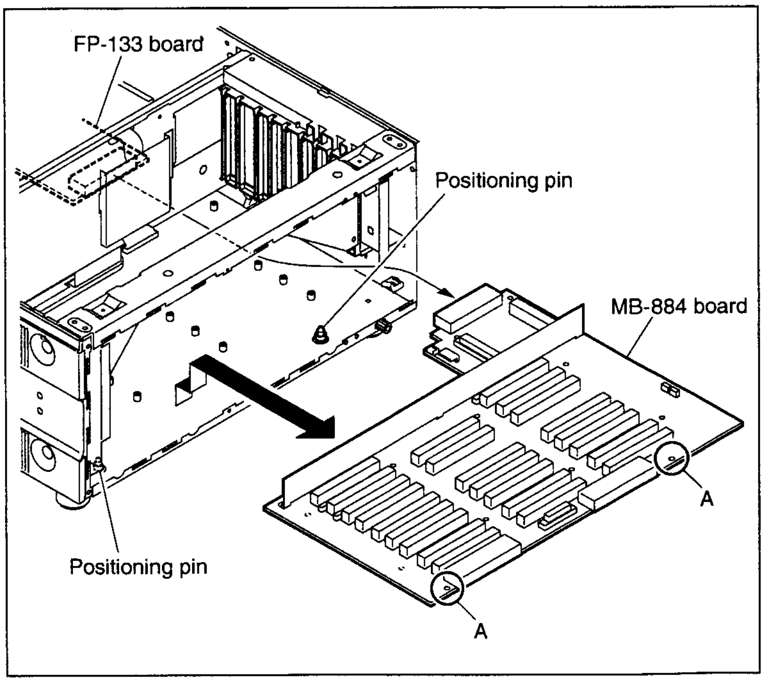
12. Remove the three screws (* mark).
13. Remove the eight screws and remove the four MS reinforcement assemblies.


PSW3 x 8
PSW3 x 8
PSW3 x 8
PSW3 x 8
PSW3 x 8
MB reinforcement assembly
MB-884 board

Remove the MB-884 Board (1)

14. Slightly lift up the MB-884 board at two A parts simultaneously, while removing the board from the positioning pins, slowly pull out the board until the connector connected to the FP-133 board is disconnected.
15. Pull out the MB-884 board while paying attention not to touch the board rear side with the chassis.

16. Perform the installation in the reverse order from steps 2 through 15.


FP-133 board
Positioning pin
MB-884 board
A
Positioning pin
A

Remove the MB-884 Board (2)

Steps after Replacement

17. Confirm that the unit functions normally.

5-27-17. TC-104 Board

Replacement

1. Turn the power off and disconnect the power cord.
2. Remove the upper lid (rear) assembly. (Refer to Section 1-3-1.)
3. Remove the AE-31 board. (Refer to Section 5-27-1.)

   Note

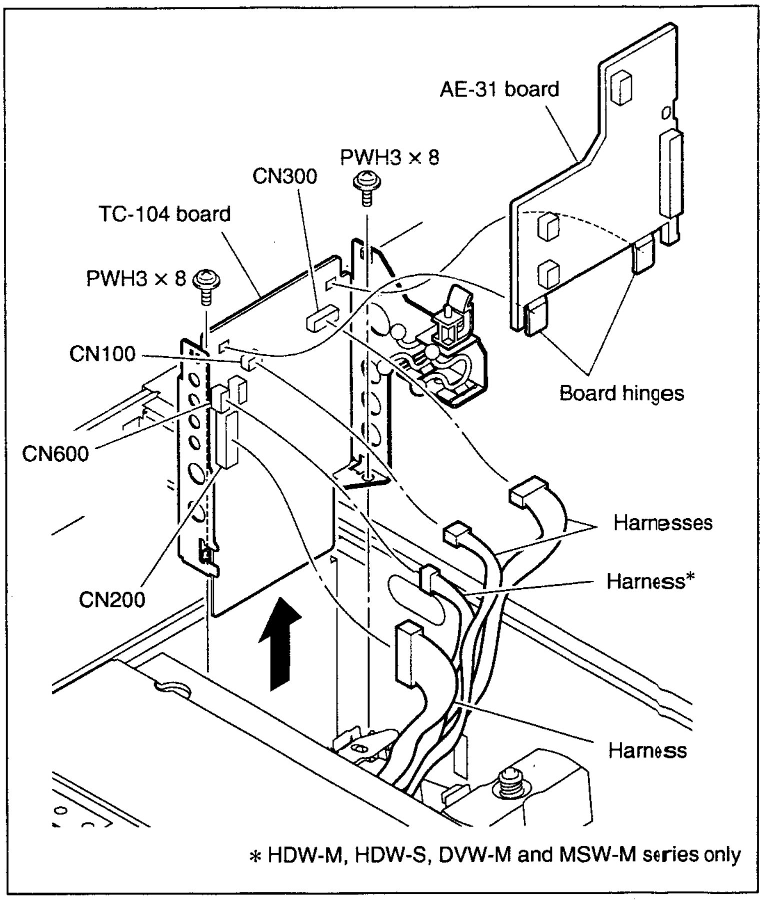
   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.

4. Disconnect the harnesses from the connectors CN100, CN200, and CN300 on the TC-104 board.

   Note

   When handling the harness connected to the AT head assembly (CN100), be sure not to apply the force to the AT head assembly. If the force is applied, perform the confirmation of the tape running at drum exit side. (Refer to Section 6-7-2.)

5. **For HDW-M, HDW-S, DVW-M and MSW-M series only**
   Disconnect the harness from the connector CN600 of the TC-104 board.
6. Remove the two screws fixing the TC-104 board.
7. Remove the TC-104 board with the AE-31 board from the MD base assembly to the arrow direction.
8. Remove the TC-104 board by remove the board hinges.
9. Perform the installation in the reverse order from steps 2 through 8.


AE-31 board
PWH3 x 8
CN300
TC-104 board
PWH3 x 8
CN100
Board hinges
CN600
Harnesses
Harness*
CN200
Harness
* HDW-M, HDW-S, DVW-M and MSW-M series only

Remove the TC-104 Board

Steps after Replacement

10. Perform the LTC system and full erasure current adjustment. (Refer to Section 8-10.)

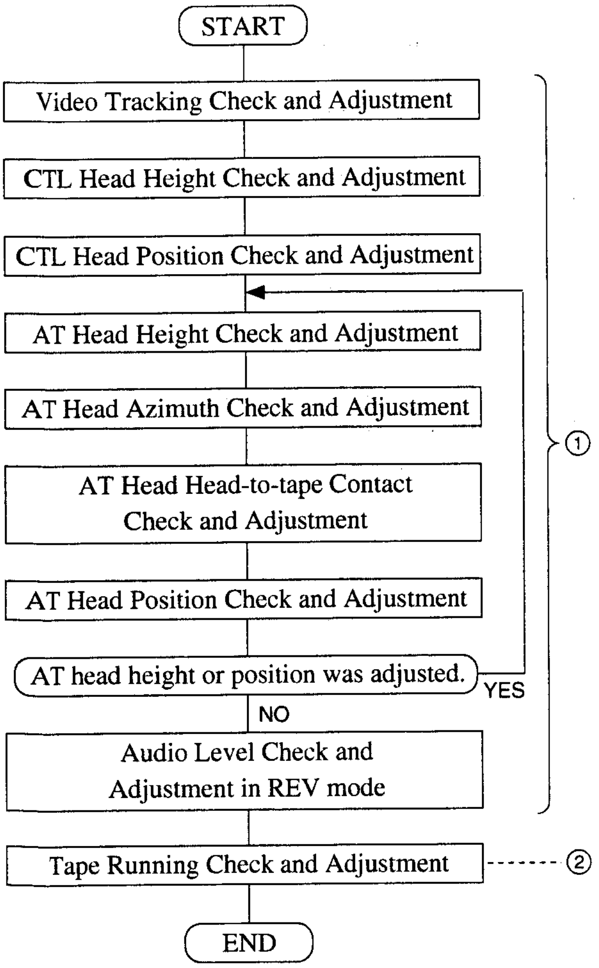
Section 6
Tape Path Alignment

This section describes the checking and adjusting methods of the tape path system such as position, height, and slantness of tape guides and stationary heads.

6-1. Tape Path Adjustment Overview

This section describes the fundamental knowledge such as preparation prior knowledge to perform the tape path system check and adjustment.

6-1-1. Tape Path Adjustment Flow Chart


START
Video Tracking Check and Adjustment
CTL Head Height Check and Adjustment
CTL Head Position Check and Adjustment
AT Head Height Check and Adjustment
AT Head Azimuth Check and Adjustment
AT Head Head-to-tape Contact Check and Adjustment
AT Head Position Check and Adjustment
AT head height or position was adjusted.
YES
NO
Audio Level Check and Adjustment in REV mode
Tape Running Check and Adjustment
①
②
END

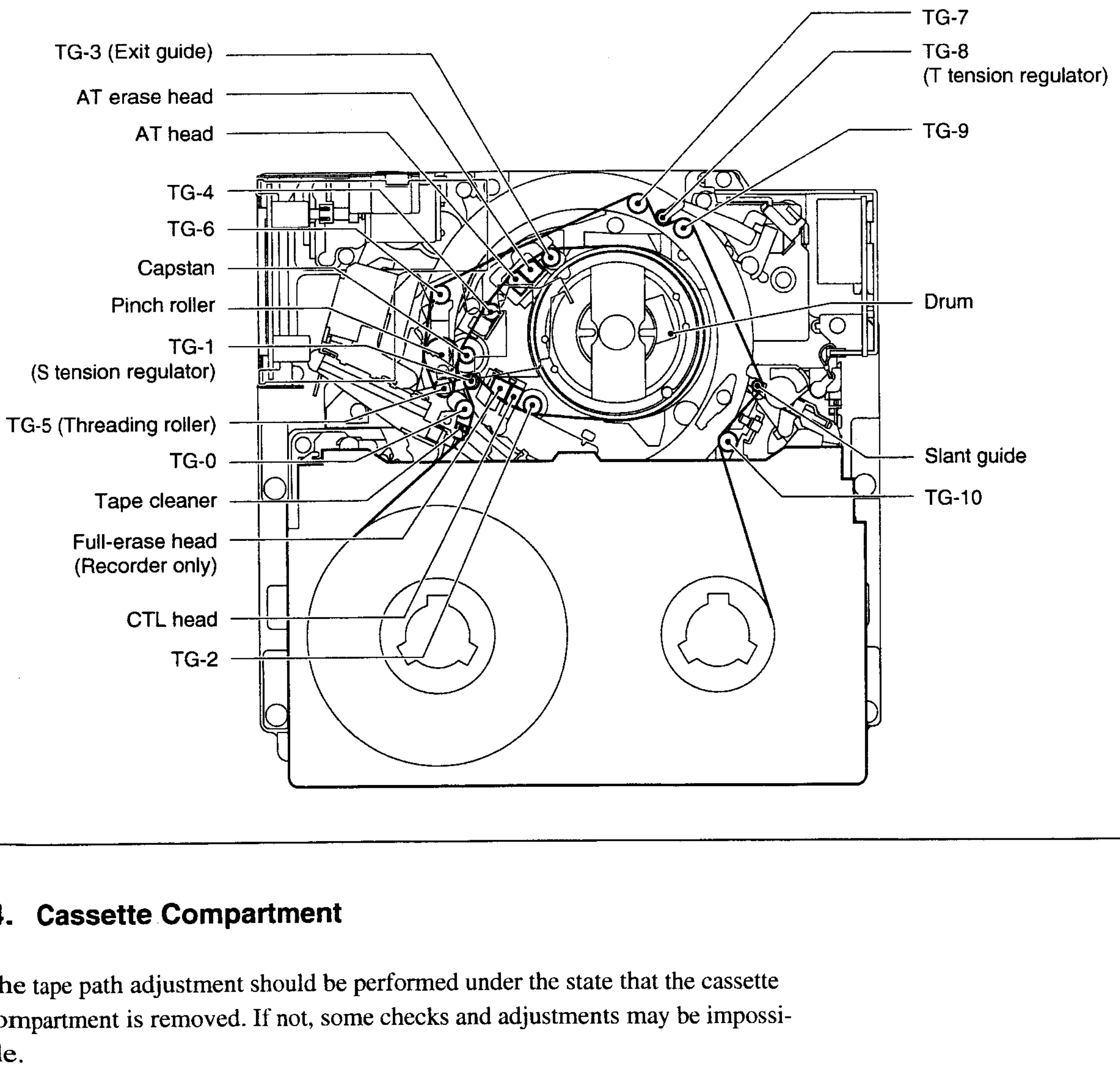
① :	For MSW recorder:	Refer to Section 6-2.
	For MSW player:	Refer to Section 6-3.
	For HDW recorder:	Refer to Section 6-4.
	For HDW player:	Refer to Section 6-5.
	For DVW recorder:	Refer to Section 6-6.
② :	Common to all models	Refer to Section 6-7.

6-1-2. Precautions

- For HDW and MSW series
  Perform the tape path adjustment in the standard mode. Although the alternative mode is available, the tape path adjustment in the alternative mode is not necessary. However, when the unit is usually used in the alternative mode, it is recommended to perform the tape path check in the mode.
  NTSC model:
    Standard mode: 59.94 Hz or 525
    Alternative mode: 50 Hz or 625
  PAL model:
    Standard mode: 50 Hz or 625
    Alternative mode: 59.94 Hz or 525
- The mechanism of the tape path system is composed of precision parts and adjusted precisely at shipment. During adjustments, do not rotate screws other than those specified.
  Rotating screws other than those specified will disable proper tape path adjustment and may result in abnormal tape-running performance.
  If screws that are not specified have been rotated accidentally, replace the whole block with a new one.
- Before replacing and loading a cassette tape or alignment tape during adjustment, turn off the power of this unit once.
  When the unit has power applied to it and the reel motor is rotating slowly, the cassette tape cannot be inserted properly.

6-1-3. Parts Location of the Tape Path System

Following figure describes the names of each part of the tape path system.
It is illustrated in the threading end mode of the recorder. " TG " in the figure means the tape guide.


TG-3 (Exit guide)
AT erase head
AT head
TG-4
TG-6
Capstan
Pinch roller
TG-1
(S tension regulator)
TG-5 (Threading roller)
TG-0
Tape cleaner
Full-erase head
(Recorder only)
CTL head
TG-2
TG-7
TG-8
(T tension regulator)
TG-9
Drum
Slant guide
TG-10

6-1-4. Cassette Compartment

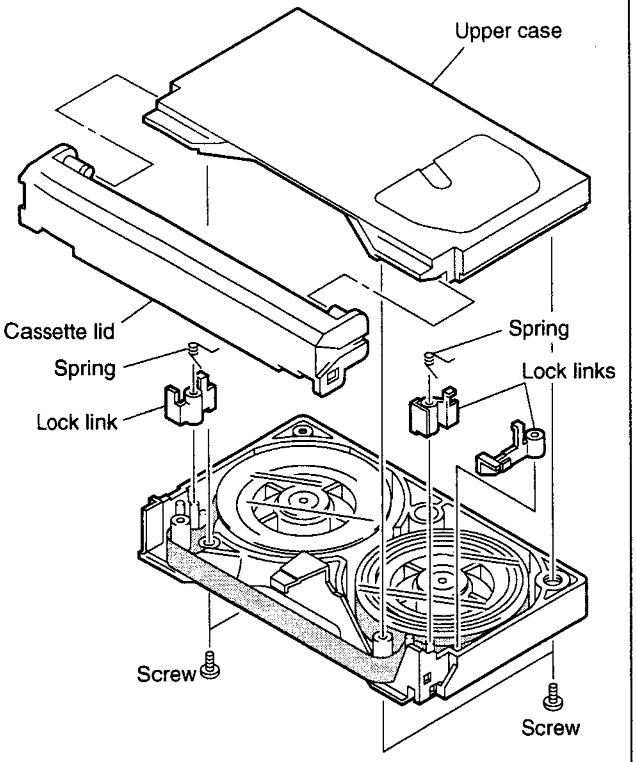
(1) The tape path adjustment should be performed under the state that the cassette compartment is removed. If not, some checks and adjustments may be impossible.

(2) When the tape path adjustment is performed with the cassette compartment removed, the tape protection circuit is activated and the "ERROR" message may be displayed. In this case, turn the power off, then turn it on again.

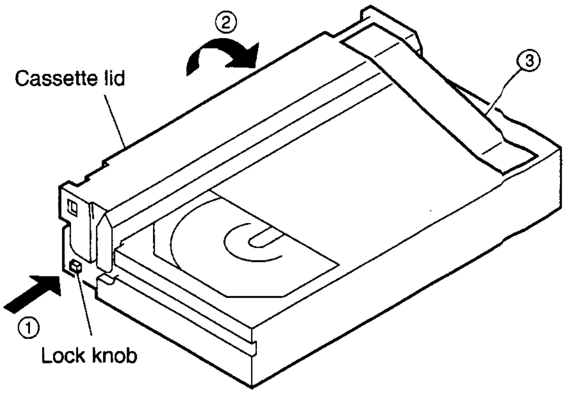
6-1-5. Cassette Tape

The tape path adjustment is performed after the cassette compartment removal. Then, it is necessary to make a modification to the cassette tape and alignment tape that are used for tape path adjustment as follows.
When setting the cassette tape or the alignment tape, align it to the cassette supports on the mechanical deck. And then, put a weight on the cassette so that it does not rise up. The weight about 1000 g is suitable.

A. Cassette tape without lid
Disassembly the cassette tape, and take off the cassette lid, lock links and springs shown in the figure.


Upper case
Cassette lid
Spring
Lock link
Spring
Lock links
Screw
Screw

B. Cassette tape with holding lid
Open the cassette lid ② while pushing the lock knob ① and fix the cassette lid using an adhesive tape ③.


②
Cassette lid
③
①
Lock knob

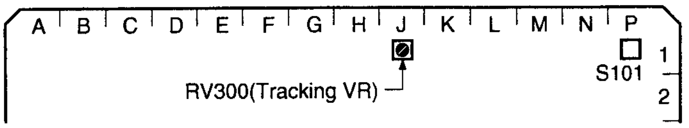
6-1-6. Tracking Control

The Bit-1 of the DIP switch S101 on the SS-89 board enables the RV300 variable resistor on the SS-89 board to control manually the tracking in the playback mode.

Bit-1 of S101/SS-89: ON (upper side): Enables tracking control manually (RV300/SS-89).
OFF (lower side): Fixes tracking control.

After the adjustment, set the Bit-1 of the S101 to OFF to fix the tracking control.

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300(Tracking VR)
S101
1
2

6-1-7. Preparation

(1) Remove the cassette compartment. (Refer to Section 1-5.)

(2) Remove the W cleaner assembly. (Refer to Section 5-5.)

Note

If the W cleaner assembly is attached, the tape-running condition may be difficult to check. Therefore, remove the W cleaner assembly before checking.

(3) Clean the following portions:
- Tape-running surfaces of upper drum and heads (Refer to Section 4-2-3.)
- Lower drum's tape-running surface and lead surface (Refer to Section 4-2-4.)
- Stationary heads (Refer to Section 4-2-5.)
- Tape-running system and tape cleaner (Refer to Section 4-2-6.)

6-1-8. Alignment Tapes

Alignment tapes for adjusting the tape path of each model are listed on the table below. For the recording descriptions of each alignment tape, refer to Section 1-20.

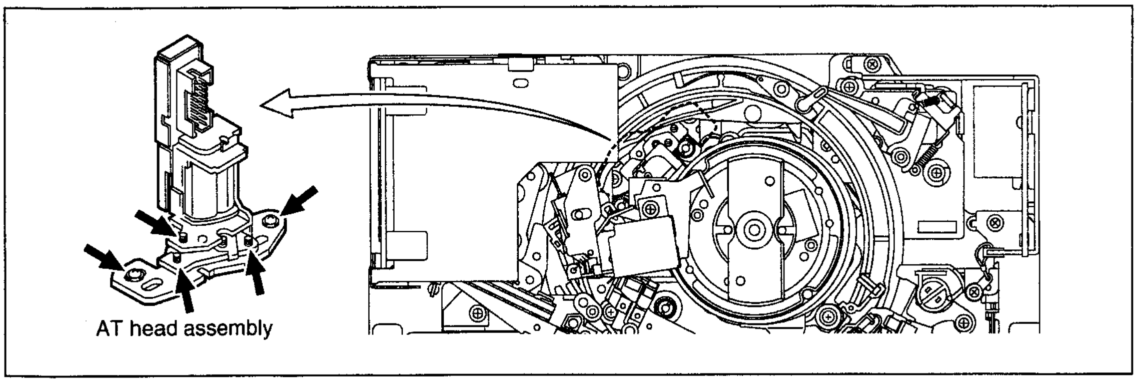
Alignment tape	**HDW-**					**DVW-**		**MSW-**			
Type	**2000**	**D2000**	**M2000** **M2000P**	**S2000** **S2000P**	**M2100** **M2100P**	**2000** **2000P**	**M2000** **M2000P**	**2000**	**A2000** **A2000P**	**M2000** **M2000P** **M2000E** **M2000EP**	**M2100** **M2100P** **M2100E** **M2100EP**
HR2-1A	O	O	O	O	O	—	—	—	—	—	—
HR5-1A	O	O	O	O	O	—	—	—	—	—	—
ZR2-1	—	—	—	—	—	N	N	—	—	—	—
ZR2-1P	—	—	—	—	—	P	P	—	—	—	—
ZR5-1	—	N	N	—	N	N	N	—	—	—	N
ZR5-1P	—	P	P	—	P	P	P	—	—	—	P
MR2-1P	—	—	—	—	—	—	—	O	O	O	O
MR5-1	—	N	N	—	N	—	—	N	N	N	N
MR5-1P	—	P	P	—	P	—	—	P	P	P	P
SR5-1	—	—	N	N	N	—	—	N	N	N	N
SR5-1P	—	—	P	P	P	—	—	P	P	P	P
CR2-1B	—	—	N	N	N	—	N	—	N	N	N
CR2-1B PS	—	—	P	P	P	—	P	—	P	P	P
CR8-1A	—	—	N	N	N	—	N	—	N	N	N
CR8-1A PS	—	—	P	P	P	—	P	—	P	P	P

O: Required N: Required for NTSC model P: Required for PAL model —: Not required

6-1-9. Locking Compound

When loosening the following screws, apply the locking compound to the screws after adjustment is completed.
The locking compound that applied to other surrounding parts must be wiped off using gauze or soft cloth.

- Locking compound : 7-432-114-11



6-2. MSW Recorder Tape Path

Applicable models: MSW-2000
MSW-A2000/A2000P
MSW-M2000/M2000P/M2000E/M2000EP

6-2-1. Video Tracking Check

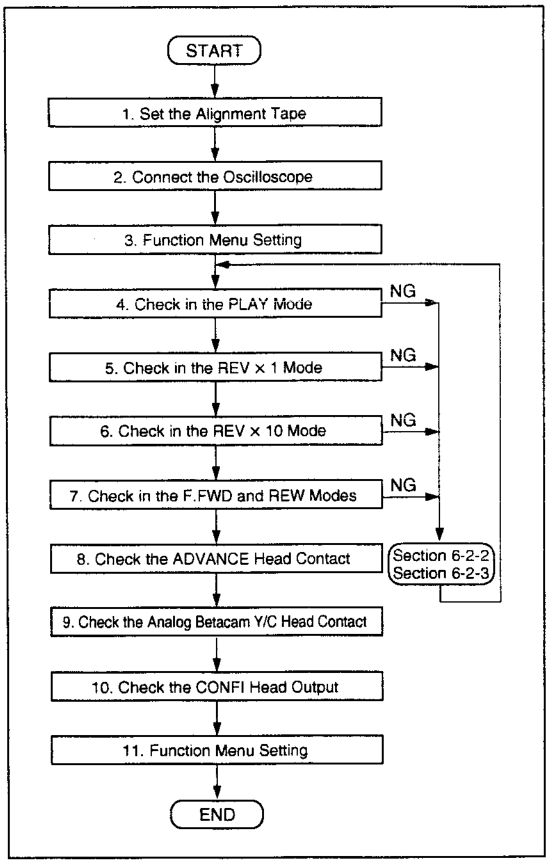
Tools

- Alignment tapes

MR2-1P (for both 525 and 625):	8-960-077-61
MR5-1 (for 525):	8-960-077-01
MR5-1P (for 625):	8-960-077-51
CR2-1B (for 525 except MSW-2000):	8-960-096-01
CR2-1B PS (for 625 except MSW-2000):	8-960-096-51
• Recording tape (S cassette):	BCT-60MX
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Small dental mirror:	J-6080-029-A
• Tape guide adjustment screwdriver (MW-261):	J-6322-610-A

Note

When checking video tracking, the RF envelope waveform (PLAY mode) should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments only when without the specifications.


START
1. Set the Alignment Tape
2. Connect the Oscilloscope
3. Function Menu Setting
4. Check in the PLAY Mode
NG
5. Check in the REV x 1 Mode
NG
6. Check in the REV x 10 Mode
NG
7. Check in the F.FWD and REW Modes
NG
8. Check the ADVANCE Head Contact
Section 6-2-2
Section 6-2-3
9. Check the Analog Betacam Y/C Head Contact
10. Check the CONFI Head Output
11. Function Menu Setting
END

Video Tracking Check/Adjustment Flow Chart

Setting

1. Set the Alignment Tape

(1) Press the switch S300 on the SS-89 board during power-on to set the reel tables to the S cassette position.

(2) Turn off the power.

(3) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.

2. Connect the Oscilloscope

- Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board (REC AC ENV signal)
CH-2: TP104/EQ-84 board (REC AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

- Oscilloscope setting:

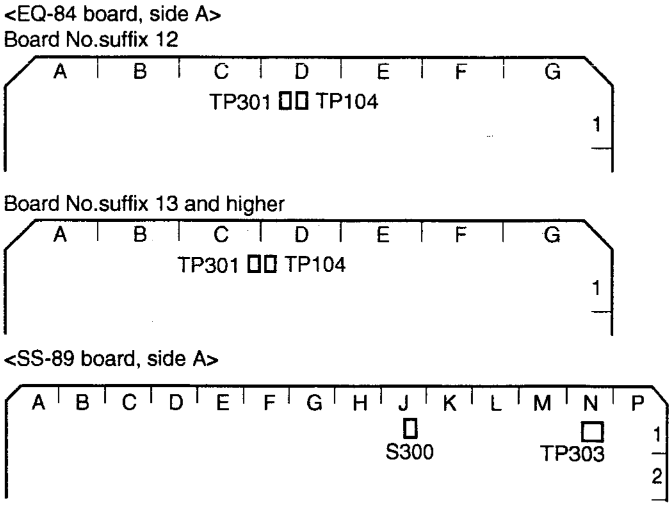
CH-1: 500 mV to 1 V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

3. Function Menu Setting

Turn on the power, then set the F1 (CAPSTN) of function menu Page4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)

- Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)


<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP301
TP104
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP301
TP104
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
S300
TP303
1
2

Preparation

Check

4. Check in the PLAY Mode

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker as shown in the figure appears following the positive slope of the CF4 signal.
Use this portion of the RF envelope waveform when checking video tracking in the PLAY mode.
If extremely abnormal waveform (Fig. 1) is output after replacing the upper drum assembly, remove and re-attach the upper drum assembly.

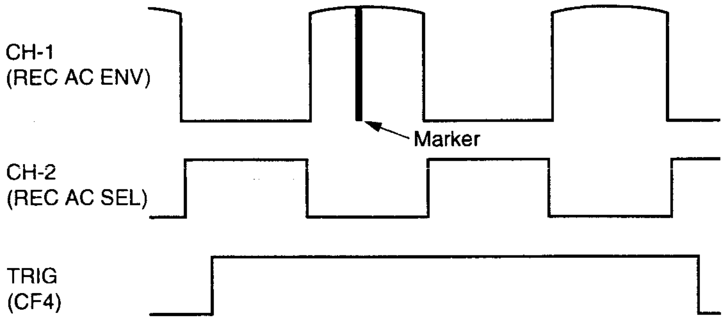
- Refference:
  Section 5-2. Upper Drum Assembly Replacement

Note

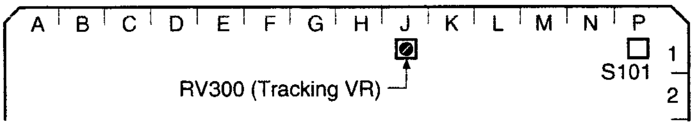
The REC AC RF envelope waveform (REC AC ENV) is output only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

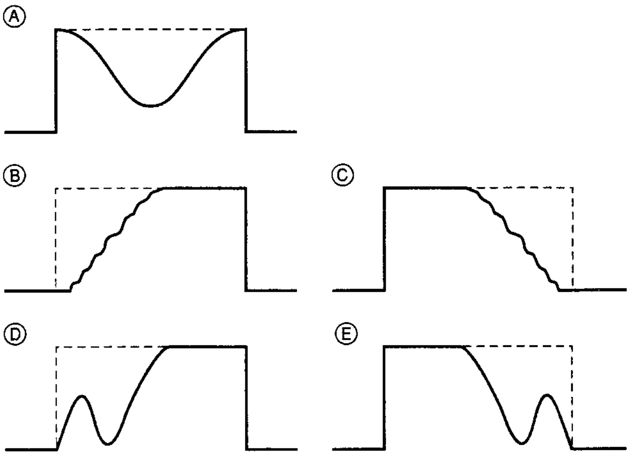
- Alignment tape : MR2-1P (00:00 to 15:00)



<SS-89 board, side A>



<Fig.1 : NG waveforms of AC ENV signal (Examples)>



(4) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(5) In the step (4) state, check to see that the RF envelope waveform satisfies specification 1.

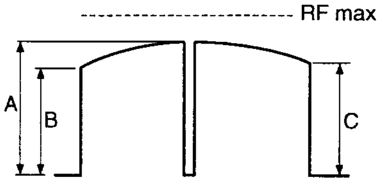
Note

If the level fluctuates, read the average value.

(6) If the level fluctuates, rotate the tracking VR to maximize the output level at the center of the RF envelope waveform, and check that the fluctuation amount satisfies specification 2.

If specifications 1 and 2 are not satisfied, perform the adjustment in the Section 6-2-2 (Tape Entrance Side) or Section 6-2-3 (Tape Exit Side).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)
  <Head-to-tape contact>

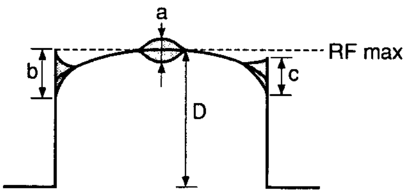


A = RF max × 0.8

Spec.1 : Output levels (B and C) at the tape entrance side and exit side are more than 70 % of the center level (A).

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$

<Fluctuation>



D = Average maximum level at waveform center

Spec.2 : Fluctuation amounts (a, b, c) at the drum center portion, entrance side and exit side are less than 20 % of the average maximum level (D).

$\frac{a}{D} \times 100 \leqq 20\ \%$ $\frac{b}{D} \times 100 \leqq 20\ \%$ $\frac{c}{D} \times 100 \leqq 20\ \%$

Video Tracking Check (PLAY)

5. Check in the REV × 1 Mode

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(2) Play back the alignment tape MR2-1P (00:00 to 15:00).

(3) Set the REV × 1 mode, and check that the RF envelope waveform satisfies specification 3.

Note

The REC AC RF envelope waveform is output only for A ch.

If the waveform at the entrance is without the specification 3, adjust tracking at the drum entrance. (Refer to Section 6-2-2.)

If the waveform at the exit is NG, adjust the height of TG-5 before tracking adjustment.

Note

Adjusting the height of TG-5:

Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

If the specification is still not satisfied, adjust tracking at the drum exit. (Refer to Section 6-2-3.)

(4) Also check that the tape is running with maintaining the state of the specification 4.

If specification 4 is not satisfied, first adjust the height of TG-5.

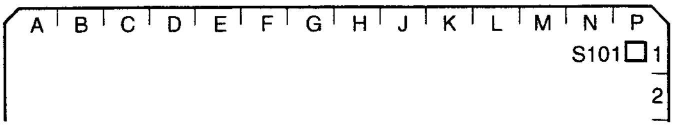
Note

Adjusting the height of TG-5

Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

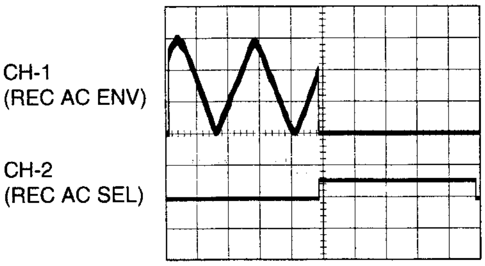
When the specification 4 is not still satisfied even after adjusting the height of TG-5, adjust the tracking at tape exit. (Refer to Section 6-2-3.)

<SS-89 board, side A>



- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

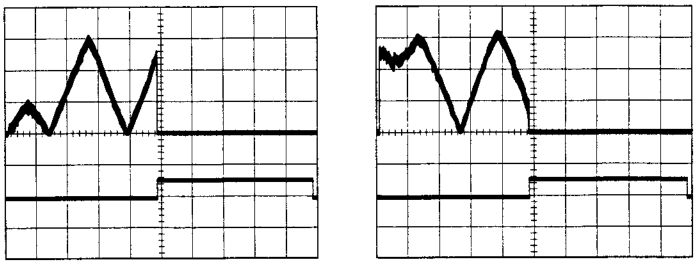
(OK)



Spec.3 : Appears waveforms with no lacking.
Uniform waveforms without variation.

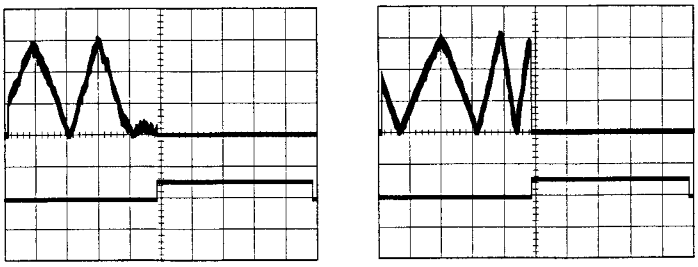
- In the case of the drum entrance side is NG (Example) :

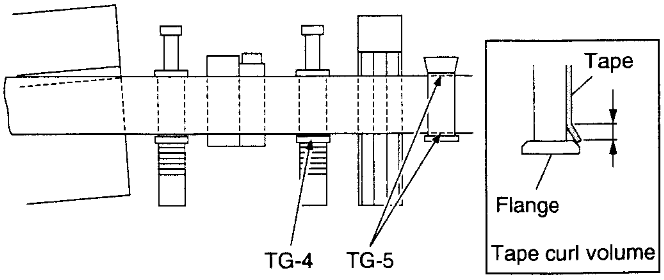
(NG) (NG)



- In the case of the drum exit side is NG (Example) :

(NG) (NG)





Spec.4 : Lower flange of TG-4
The tape curl is less than 1/10 of the tape width.

Video Tracking Check (REV × 1)

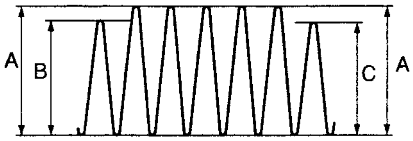
6. Check in the REV × 10 Mode

(1) Play back the alignment tape MR2-1P (00:00 to 15:00).

(2) Set the REV × 10 mode, and check that the RF envelope waveform satisfies specification 5.

If specification 5 is not satisfied, perform the adjustment in the Section 6-2-2 (Tape Entrance Side) or Section 6-2-3 (Tape Exit Side).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.5 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)

Video Tracking Check (REV × 10)

7. Check in the F.FWD and REW Modes

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board (ADV BD ENV signal)
TRIG: TP100/ EQ-84 board (ADV AC SEL signal)

(2) Play back the alignment tape MR2-1P (00:00 to 15:00).

(3) Set the F.FWD mode, and check that the RF waveform satisfies specification 6 and specification 7.

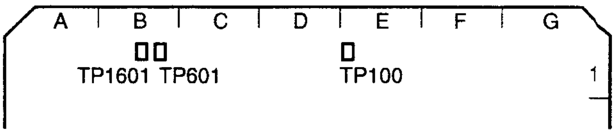
(4) Set the REW mode, and check that the RF waveform satisfies specification 6 and specification 7.

If specifications 6 and 7 are not satisfied, perform the adjustment in the Section 6-2-2 (Tape Entrance Side) or Section 6-2-3 (Tape Exit Side).

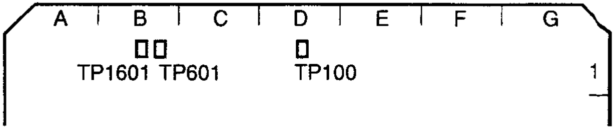
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

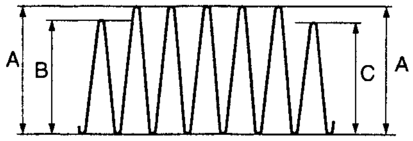
<EQ-84 board, side A >
Board No.suffix 12



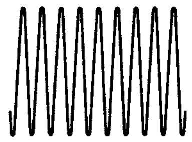
Board No.suffix 13 and higher



- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.6 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)



Spec.7 : Appears waveforms with no lacking.

Video Tracking Check (F.FWD, REW)

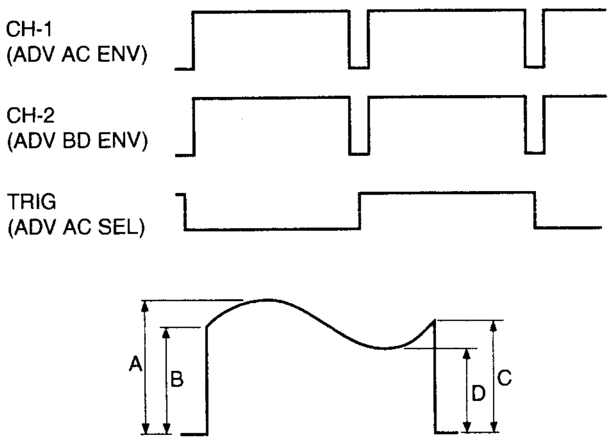
8. Check the ADVANCE Head Contact

(1) Play back the alignment tape MR5-1 or MR5-1P in the PLAY mode.

(2) Check that the RF envelope waveforms of ADV AC ENV and ADV BD ENV satisfy specification 8.

(3) Turn off the power, then remove the alignment tape.

- Alignment tape : MR5-1/MR5-1P
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.8 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A}\times 100 \geqq 70\ \%$ $\frac{C}{A}\times 100 \geqq 70\ \%$ $\frac{D}{A}\times 100 \geqq 70\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

ADVANCE Head Contact Check

9. Check the Analog Betacam Y/C Head Contact

Note

This step 9 is not required for MSW-2000.

(1) Set the oscilloscope as follows:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(2) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(3) Set Bit-1, Bit-2 and Bit-3 of DIP switch S101 on the SS-89 board to ON (pushed up).

(4) Turn on the power, then play back CR2-1B/ CR2-1B PS in the PLAY mode.

Note

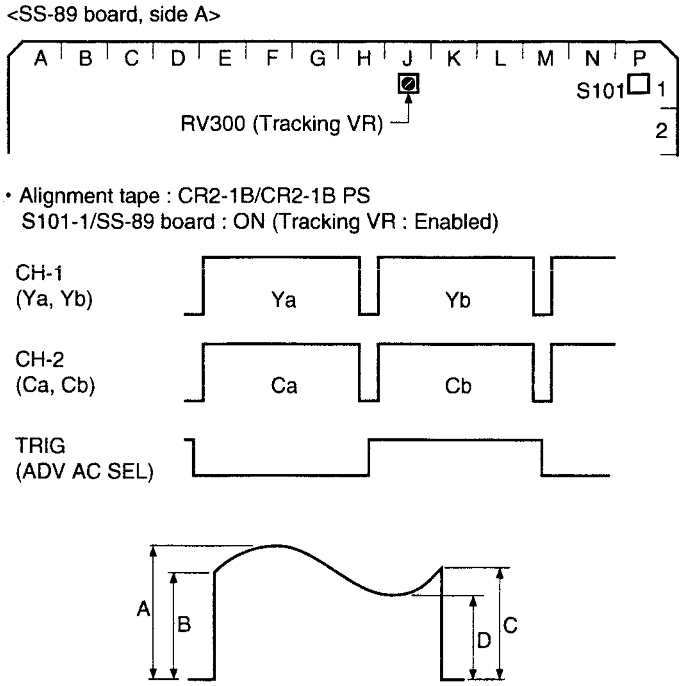
The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(5) Rotate the tracking VR (RV300/SS-89) to maximize the level at the center of the RF envelope waveform.

(6) Check that the RF envelope waveform is output in each channel.
Check that the Ya and Ca RF envelope waveforms satisfy specification 9.

(7) Turn off the power, then remove CR2-1B/ CR2-1B PS.

(8) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).



<SS-89 board, side A>

- Alignment tape : CR2-1B/CR2-1B PS
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

Spec.9 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\ \%$ $\frac{C}{A} \times 100 \geqq 75\ \%$ $\frac{D}{A} \times 100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

Analog Betacam Y/C Head Contact Check

10. Check the CONFI Head Output

(1) Connect the oscilloscope as follows:

CH-1: TP701/EQ-84 board (CONFI AC ENV signal)
CH-2: TP1701/ EQ-84 board (CONFI BD ENV signal)
TRIG: TP102/ EQ-84 board (CONFI AC SEL signal)

Oscilloscope setting:

CH-1: 500 mV/DIV
CH-2: 500 mV/DIV
TRIG: 5 V/DIV
TIME: 5 ms

(2) Set the recording tape BCT-60MX and put a weight (about 1000 g) onto it.

(3) Turn on the power.

(4) While pressing the PLAY button, press the REC button to set the recording mode.

(5) Check that the RF waveform is output from CH1 and CH2 during recording as shown in the figure and that specification 10 is satisfied.

(6) Turn off the power, then remove the recording tape.

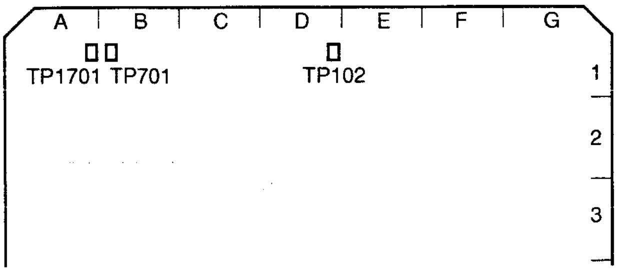
11. Function Menu Setting

Turn on the power, then return F1 (CAPSTN) of function menu Page 4 to the customer setting.

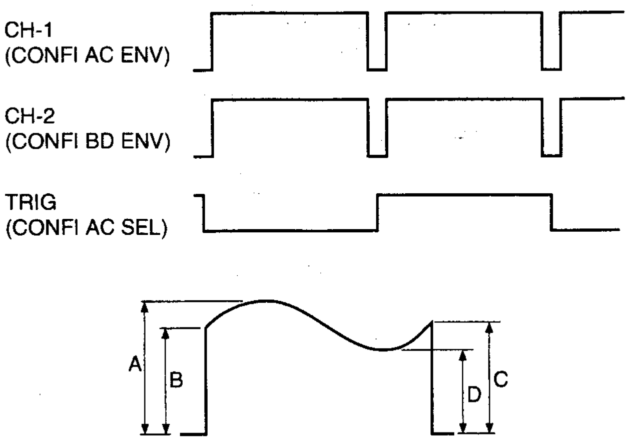
- Connection of the oscilloscope

CH-1 : TP701/EQ-84 board (CONFI AC ENV signal)
CH-2 : TP1701/EQ-84 board (CONFI BD ENV signal)
TRIG : TP102/EQ-84 board (CONFI AC SEL signal)

<EQ-84 board, side A>



<CONFI output waveform>



Spec.10 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 70\%$ $\frac{C}{A} \times 100 \geqq 70\%$ $\frac{D}{A} \times 100 \geqq 70\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

CONFI Head Output Check

6-2-2. Tracking Adjustment at the Tape Entrance Side

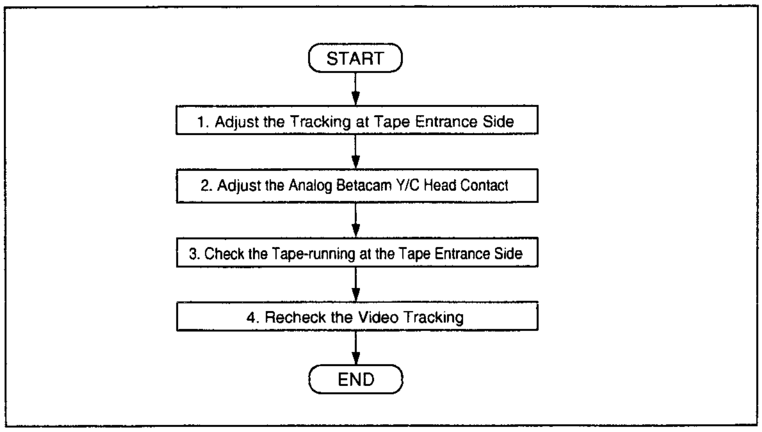
This adjustment should be performed when the specifications have not been satisfied in Section 6-2-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-2-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat to the entrance and exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the followings:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.


START
1. Adjust the Tracking at Tape Entrance Side
2. Adjust the Analog Betacam Y/C Head Contact
3. Check the Tape-running at the Tape Entrance Side
4. Recheck the Video Tracking
END

Flow Chart of Tracking Adjustment at the Tape Entrance Side

1. Adjust the Tracking at the Tape Entrance Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

(2) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level. (Fig. 1)

(4) Loosen the height adjustment nut of TG-2 so that the tape does not in contact the upper flange. (Fig. 2)

(5) Rotate the height adjustment nut of TG-1 to flatten the RF envelope waveform. (Fig. 1)

If the waveform does not become flat, perform the following adjustment (① to ③).

① Clean the lower drum lead with a wooden stick. (Refer to Section 4-2-4.)

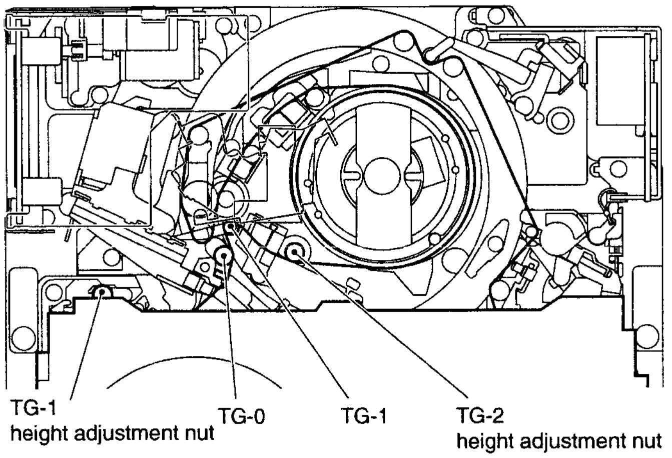
② While running the tape, press the tape lightly with the wooden stick and check that the tape does not float from the lead.

③ Adjust the height of TG-1 so that the RF envelope waveform becomes as flat as possible within the scope of Specification 11 in Fig. 3.

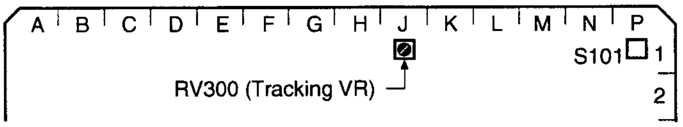
(6) Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 4)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

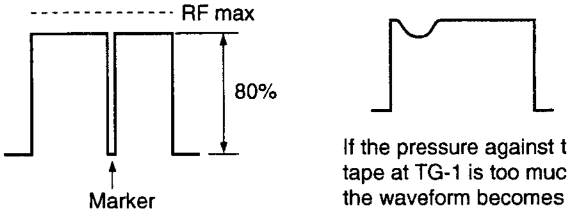

TG-1
height adjustment nut
TG-0
TG-1
TG-2
height adjustment nut

<SS-89 board, side A>


A B C D E F G H J K L M N P
S101 1
2
RV300 (Tracking VR)

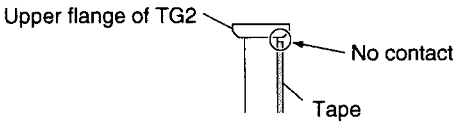
- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>

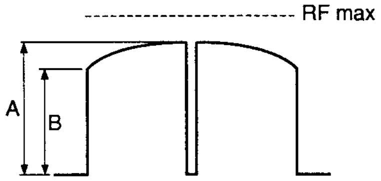


If the pressure against the tape at TG-1 is too much, the waveform becomes as shown in the upper figure. (NG)

<Fig.2>


Upper flange of TG2
No contact
Tape

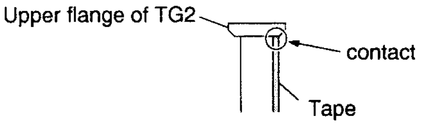
<Fig.3>



A = RF max × 0.8

Spec.11: $\frac{B}{A} \times 100 \geqq 70$ %

<Fig.4>


Upper flange of TG2
contact
Tape

Tracking Adjustment at Tape Entrance Side (PLAY)

2. Adjust the Analog Betacam Y/C Head Contact

Note

This step 2 is not required for MSW-2000.

(1) Turn off the power, then remove the alignment tape.

(2) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board (ADV BD ENV signal)
TRIG: TP100/ EQ-84 board (ADV AC SEL signal)
Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(3) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(4) Set Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(5) Turn on the power, then playback the CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(6) Turn the tracking VR (RV300/SS-89 board) so that the center portion of the RF envelope waveform becomes the maximum output level.

(7) Check that the RF envelope waveform is output in each channel. Check that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 12.

If specification 12 is not satisfied, perform step (12) and later.

(8) Turn off the power, then remove the alignment tape CR2-1B/CR2-1B PS.

(9) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

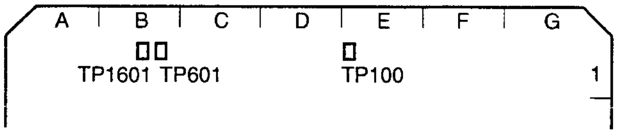
(10)Set the alignment tape MR2-1P and put the weight (approx. 1000 g) onto it.

(11)Turn on the power, then perform following step 3 and later.

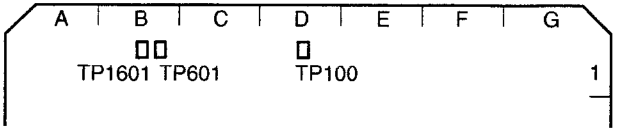
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

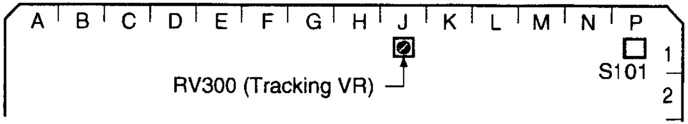
<EQ-84 board, side A>
Board No.suffix 12



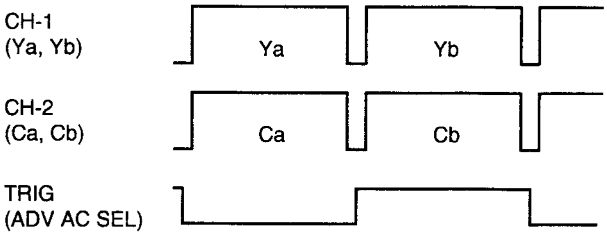
Board No.suffix 13 and higher

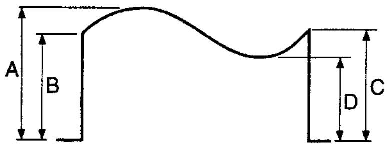


<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.12 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\%$ $\frac{C}{A} \times 100 \geqq 75\%$ $\frac{D}{A} \times 100 \geqq 75\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

(12)Loosen the height adjustment nut of TG-2 so that the tape does not touch the upper flange. (Fig. 5)

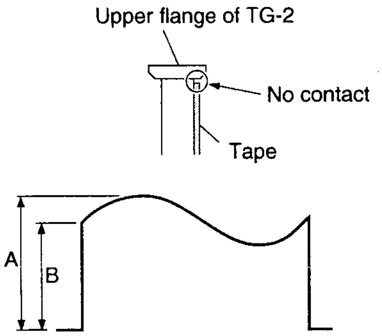
(13)Rotate the height adjustment nut of TG-1 and adjust so that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 13.

(14)Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 6)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

<Fig.5>

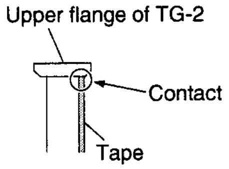


Spec.13 : The output of the entrance waveform must be 80 % of maximum value.

$\frac{B}{A} \times 100 = 80\ \%$ (Not B/A x 100 > 80 %)

However if the outputs of the entrance waveform of the Ya RF envelope waveform and Ca RF envelope waveform are both not 80 % of the maximum value, adjust so that the RF envelope with the smaller entrance waveform output becomes 80 % of the maximum value.

<Fig.6>



Analog Betacam Y/C Head Contact Adjustment

(15)Turn off the power, then remove the CR2-1B/CR2-1B PS.

(16)Reset Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(17)Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board
(REC AC ENV signal)
CH-2: TP104/EQ-84 board
(REC AC SEL signal)
TRIG: TP303/SS-89 board
(CF4 signal)

(18)Change the oscilloscope setting as follows:

CH1: 500 mV to 1V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

(19)Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.

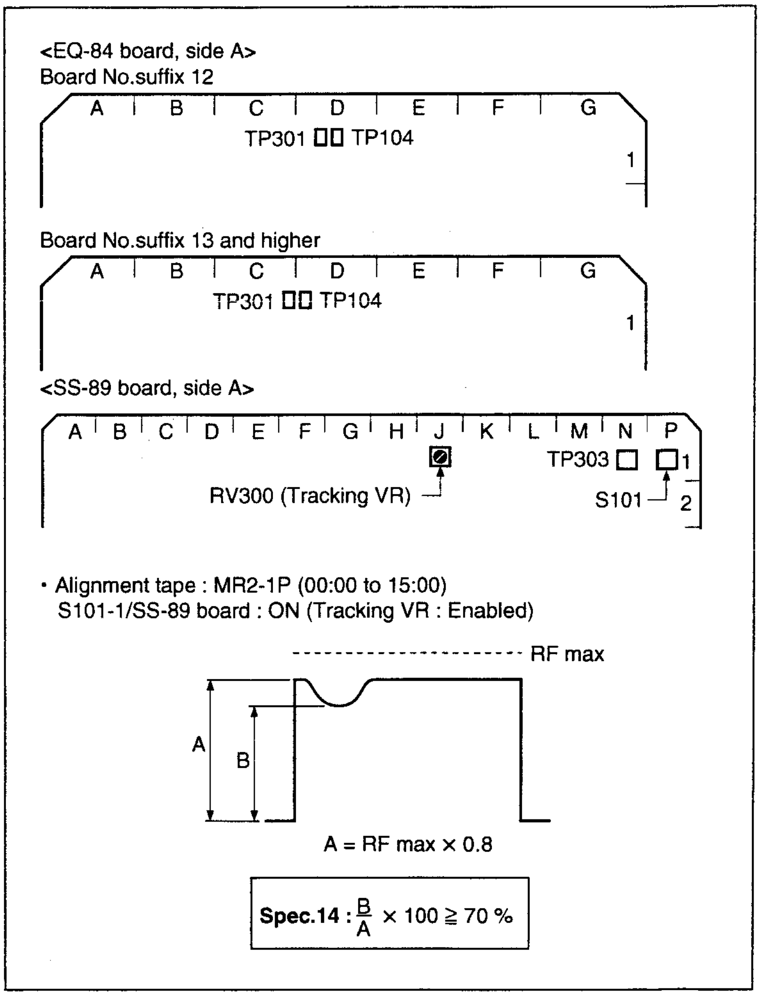
(20)Turn on the power, then play back the alignment tape (00:00 to 15:00) in the PLAY mode.

(21)Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(22)Check that the levels A and B shown in the figure satisfy specification 14.

(23)Reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

If specification 14 is not satisfied, perform the adjustment from (3) of step 1 and later again.


<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP301
TP104
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP301
TP104
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
TP303
1
RV300 (Tracking VR)
S101
2
• Alignment tape : MR2-1P (00:00 to 15:00)
S101-1/SS-89 board : ON (Tracking VR : Enabled)
RF max
A
B
A = RF max × 0.8
Spec.14 : B/A × 100 ≧ 70 %

Tracking Adjustment

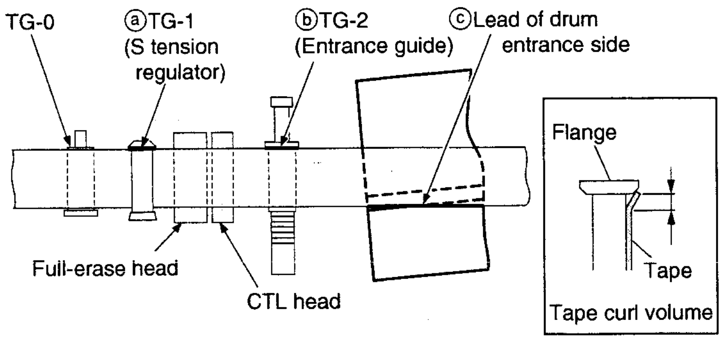
3. Check the Tape-running at the Tape Entrance Side

(1) Check the tape-running at the tape entrance side in each of the following modes:
- PLAY mode
- F.FWD mode

If the curl of any of the tape guides does not satisfy specification 15, perform the adjustment from (3) of step 1 and later again.

(2) Check the tape-running at the tape entrance in each of the following modes:
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the curl of any of the tape guides does not satisfy specification 16, perform the adjustment from (3) of step 1 and later again.



Spec.15 : ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.16 : ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at the Tape Entrance Side

4. Recheck the Video Tracking

Perform steps from 3 to 11 in Section 6-2-1.

Note

After adjusting, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-2-3. Tracking Adjustment at the Tape Exit Side

This adjustment should be performed when the specifications have not been satisfied in Section 6-2-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-2-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the following:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

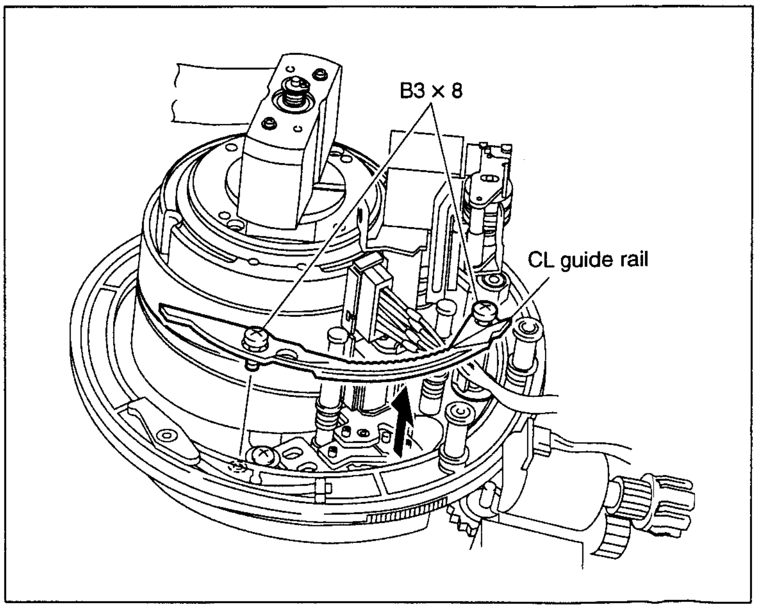
Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.

1. Remove the CL Guide Rail

(1) Turn off the power.
(2) Fully loosen the two screws to remove the CL guide rail.

Note

Do not pull out the screws because the screw holes on the CL guide rail are shaped in such a way to prevent screws from falling.



CL Guide Rail Removal

2. Adjust the Tracking at the Tape Exit Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(2) Turn on the power, then play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) to set the center of the RF envelope waveform to the maximum output level.

(4) Turn the height adjustment nut of TG-3 counterclockwise by one to two turns so that the tape does not in contact with the upper flange of TG-3.

Note

Don't turn excessively the nut, or the tape bottom edge does in contact with the lower flange of TG-3.

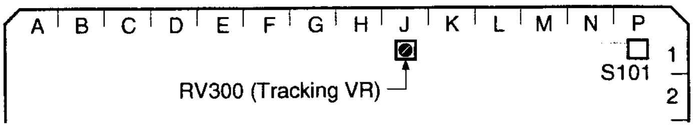
(5) Turn the height adjustment nut of TG-4 clockwise so that the tape does not in contact with the lower flange of TG-4.

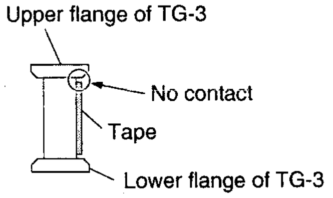
(6) Check that the RF envelope waveform satisfies the specification 17. (Fig. 1)
If satisfied, perform the step (8) and later.
If not, perform the step (7) and later.

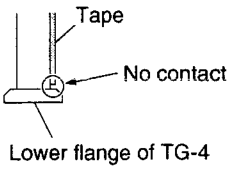
(7) Turn the zenith adjustment screw of the AT head so that the right portion of the RF envelope waveform makes 60 % or less of the maximum output level. (specification 17)
At this time, check that the tape does not in contact with both upper flange of TG-3 and lower flange of TG-4.
If the tape contacts either flange, repeat step (4) or (5).
If the tape moves upward or downward following the guide flange movement, perform the following adjustment.
This trouble cause is uneven tape tension at upside or downside of the tape caused by AT head zenith.

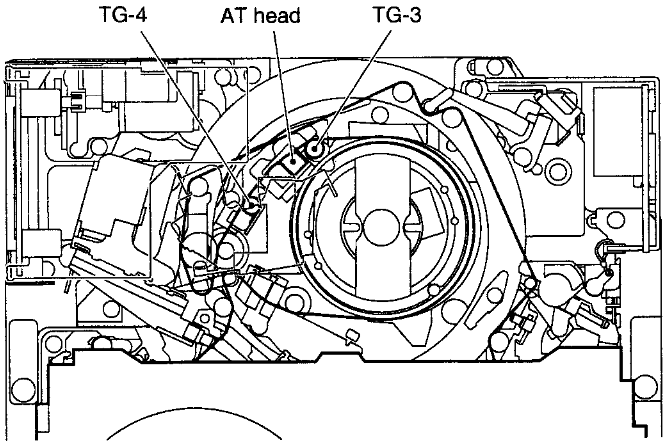
- If the tape moves upward at TG-3:
  Turn the zenith adjustment screw counterclockwise.
- If the tape moves downward at TG-4:
  Turn the zenith adjustment screw clockwise.

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
S101
RV300 (Tracking VR)

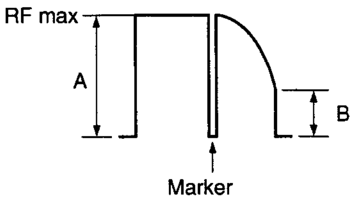

Upper flange of TG-3
No contact
Tape
Lower flange of TG-3


Tape
No contact
Lower flange of TG-4

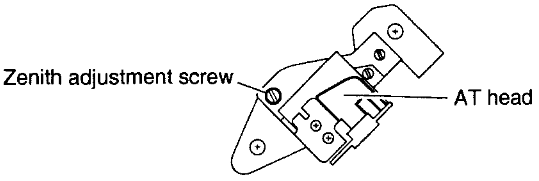

TG-4
AT head
TG-3

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>


RF max
A
B
Marker

Spec.17 : $\frac{B}{A} \times 100 = 30 \pm 30$ %


Zenith adjustment screw
AT head

(8) Turn the height adjustment nut of TG-3 clockwise so that the tape is in contact with the upper flange and the RF envelope waveform becomes flat. (Fig. 2)
Simultaneously, ensure that the tape does not in contact with the lower flange of TG-4.

If the waveform does not become flat, perform the steps ① to ③ (check and adjustment) below:

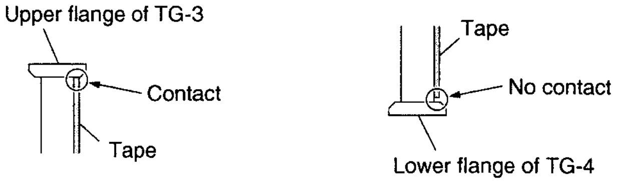
① Clean the drum lead with a wooden stick. (Refer to Section 4-2-4.)

② Press down the tape by wooden stick very lightly and check to see that the tape is running without aparting from the drum lead.

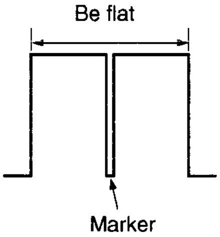
③ If the waveform does not become flat even after performing steps ① and ②, adjust the height of TG-3 so that the RF envelope waveform is nearly flat within the range of the specification 18 shown in the Fig.3. At this time, do not overpress the tape at TG-3.

Note

After adjusting the height of TG-3 in step ③ above, be sure to check the height of AT head (Refer to Section 6-2-6 or 6-2-7). If the AT head height does not satisfy the specification, repeat the video tracking adjustment.

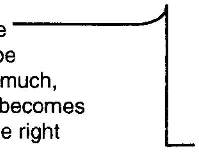


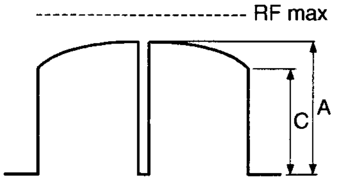
<Fig.2>



<Fig.3>

In the pressure against the tape at TG-3 is too much, the waveform becomes as shown in the right figure. (NG)





A = RF max × 0.8

Spec.18 : $\frac{C}{A} \times 100 \geqq 70\ \%$

(9) Adjust the height of TG-4 so that the lower flange of TG-4 in contact with the tape.

(10)Check the tape-running at the tape exit side in the following modes:

- PLAY mode
- F. FWD mode
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the tape curl at TG-3 does not satisfy the specification 19, perform the steps ① and ② (adjustment) below.

① Change the zenith of the AT head within the range of the specification 17.
(Refer to previous step (7).)

② Perform the tracking adjustment again.
(Refer to previous steps (2) through (10).)

(11)If the AT head zenith was changed in above ①, perform the checks and adjustments described below:

- AT head height (Refer to Section 6-2-6 or 6-2-7.)
- AT head azimuth (Refer to Section 6-2-8.)
- AT head head-to-tape contact (Refer to Section 6-2-9.)
- AT head position (Refer to Section 6-2-10.)

3. Attach the CL Guide Rail

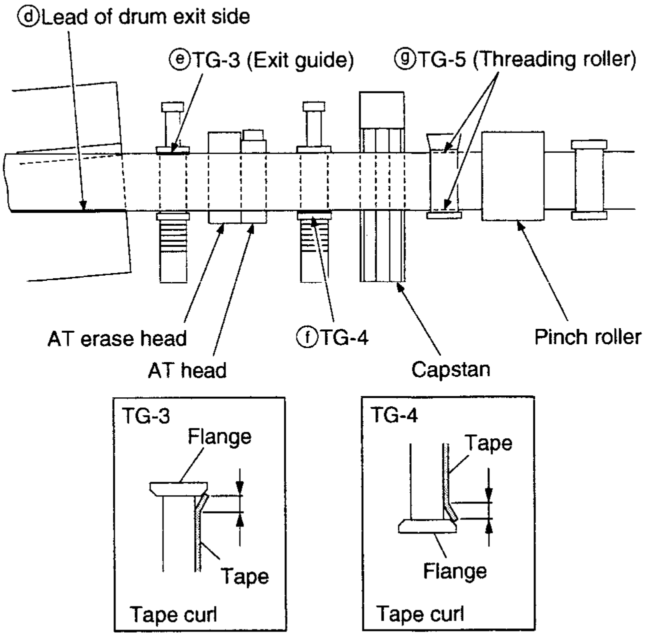
Turn off the power, then attach the CL guide rail.

4. Recheck the Video Tracking

Perform the steps 4 through 11 in Section 6-2-1 again.

Note

After adjustment, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).



Spec.19 : ⓓ Lead of drum exit side
The tape runs without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5 (Threading roller)
The tape runs without any curl at the upper and lower flanges.

Tracking Adjustment at the Tape Exit Side

6-2-4. CTL Head Height Check and Adjustment

Tools

- Alignment tape MR2-1P: 8-960-077-61
- Oscilloscope (Tektronix TDS460A or equivalent)
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

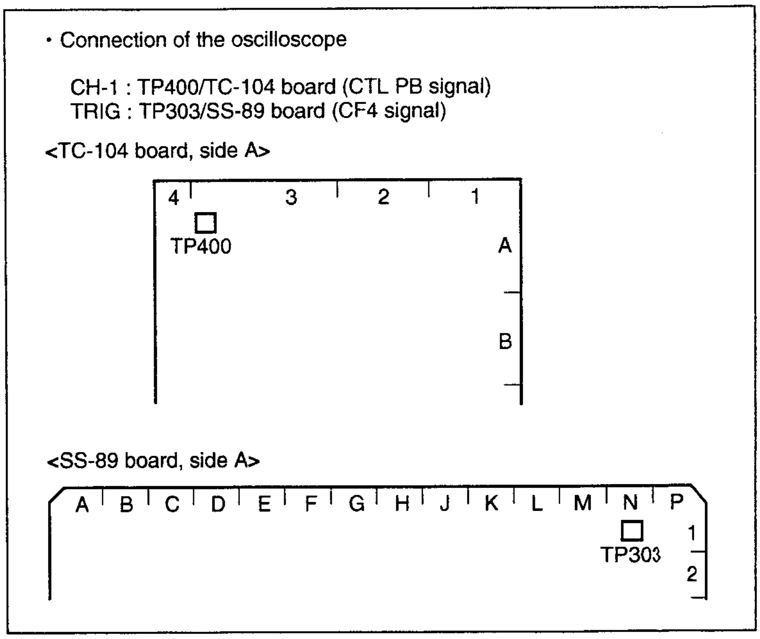
(2) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

CH-1: TP400/TC-104 board (CTL PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
TIME: 5 ms/DIV



- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

Preparation

Check

3. Check the CTL Head Height

Note

Never rotate the screw of portion C shown in the figure, or that might cause malfunctioning of tape running and head performance.

(1) Play back the alignment tape MR2-1P (15:00 to 25:00) in the PLAY mode.

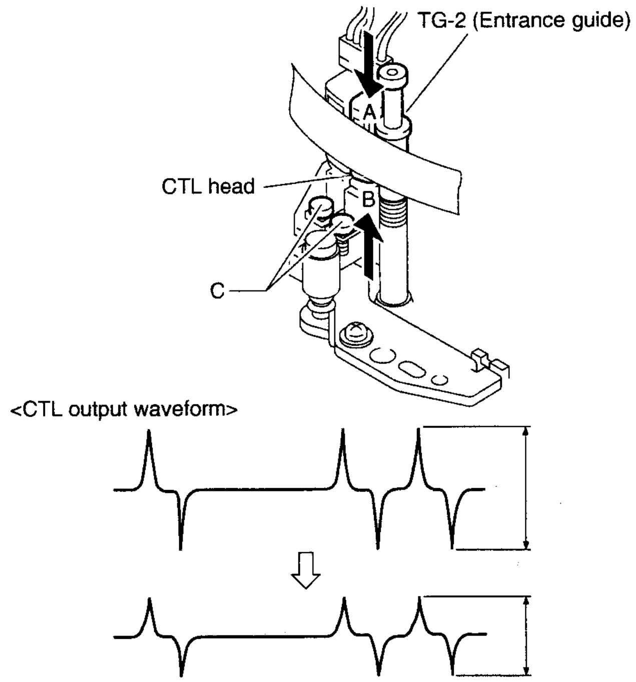
(2) Press down the portion A of the tape shown in figure, and then check to see that the level decreases by pressing the tape.

If the level increases, perform step 4-Ⓐ.

(3) Push up the portion B of the tape, and then check to see that the level decreases by pushing the tape.

If the level increases, perform step 4-Ⓑ.

• Alignment tape : MR2-1P (15:00 to 25:00)



Spec. : The level decreases when pressing down and when pushing up the alignment tape.

CTL Head Height Check

Adjustment

4. CTL Head Height Adjustment

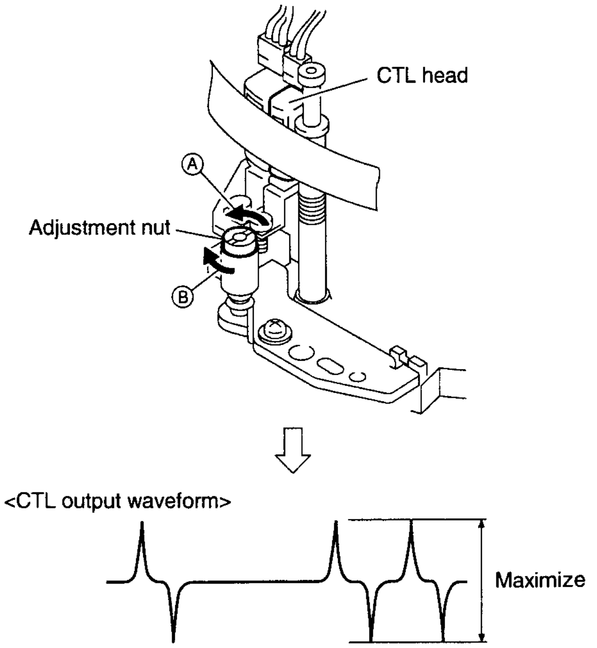
Ⓐ When the Level Increased by Pressing Down the Tape

Turn the adjustment nut counterclockwise (in the arrow Ⓐ direction) so that the output waveform is maximum.

Ⓑ When the Level Increases by Pushing Up the Tape

Turn the adjustment nut clockwise (in the arrow Ⓑ direction) so that the output waveform is maximum.

• Alignment tape : MR2-1P (15:00 to 25:00)



CTL Head Height Adjustment

6-2-5. CTL Head Position Check and Adjustment

Precaution

The CTL head position adjustment is closely related to the AT head position adjustment.
Be sure to confirm the AT head position after adjusting the CTL head position.

Tools

• Alignment tape MR2-1P:	8-960-077-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

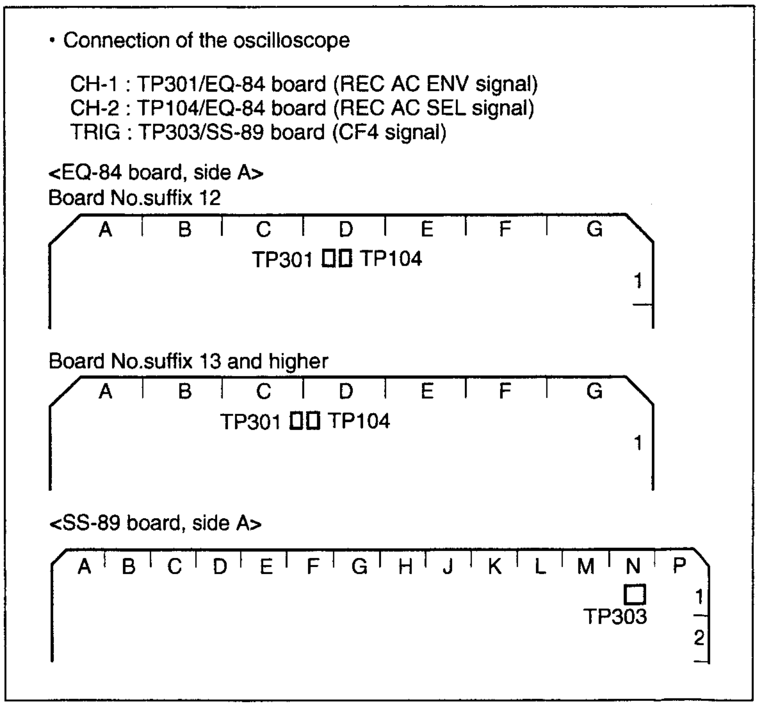
(1) Turn off the power.
(2) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board (REC AC ENV signal)
CH-2: TP104/EQ-84 board (REC AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

Oscilloscope setting:
CH-1: 500 mV to 1 V/DIV
TRIG: 5 V/DIV
TIME: 2 ms/DIV



• Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)

<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP301
TP104
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP301
TP104
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
TP303
1
2

Preparation

Check

3. Check the CTL Head Position

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker shown in the figure is appeared following the positive slope of the CF4 signal. (Specification 1)

Note

The REC A/C RF envelope waveform (REC AC ENV) is output only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

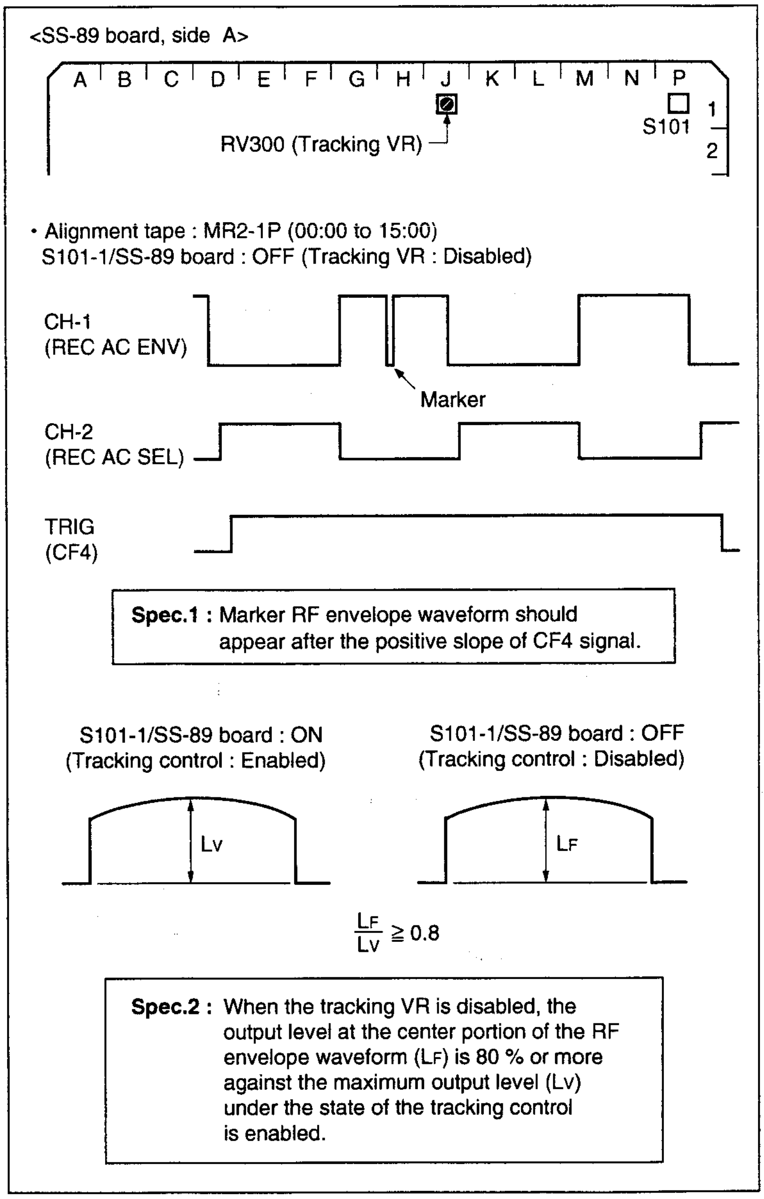
(4) Rotate the tracking VR (RV300/SS-89 board) until the output level at the center of the RF envelope with the marker confirmed in step (2) becomes maximum, and read the level (Lv) at that time.

(5) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(6) Read the output level (LF) at the center of the RF envelope waveform.

(7) Check that the level (Lv) read at step (4) and the level (LF) read at step (6) satisfy specification 2.

If they are without the specification, perform following step 4 and later.


<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
S101
RV300 (Tracking VR)
CH-1
(REC AC ENV)
Marker
CH-2
(REC AC SEL)
TRIG
(CF4)
S101-1/SS-89 board : ON
(Tracking control : Enabled)
S101-1/SS-89 board : OFF
(Tracking control : Disabled)
Lv
LF

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

Spec.1 : Marker RF envelope waveform should appear after the positive slope of CF4 signal.

$$\frac{L_F}{L_V} \geqq 0.8$$

Spec.2 : When the tracking VR is disabled, the output level at the center portion of the RF envelope waveform (LF) is 80 % or more against the maximum output level (Lv) under the state of the tracking control is enabled.

CTL Head Position Check

Adjustment

Note

Ensure that the tracking control is disabled (S101-1/SS-89 board ⇨ OFF) before following adjustment.

4. Adjust the CTL Head Position

(1) Loosen the securing screw of the CTL/FE head assembly by 1/4 to 1/2 turn.

(2) Insert a 3 mm flatbladed screwdriver into the notch of the CTL/FE head assembly.

(3) Adjust the CTL/FE head assembly position so that the output level at the center portion is maximum and the marker appears in the RF envelope waveform following the positive slope of the CF4 signal. (Specification 3)

Note

The REC A/C RF envelope waveform (REC AC ENV) is output only for A ch.

(4) Tighten the screw loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf • cm}

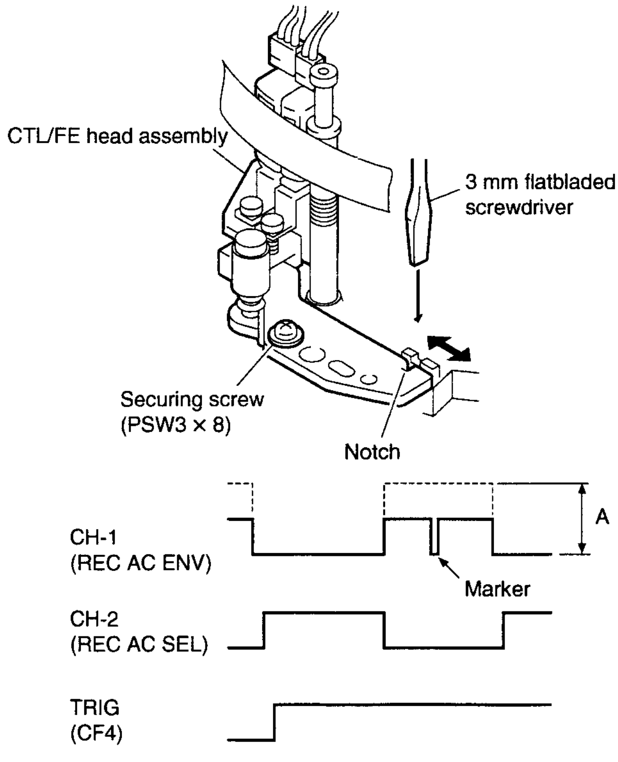
5. Recheck the CTL Head Position

Perform step 3 again.

Note

After adjustment, be sure to reset Bit-1 of the Dip switch S101 on the SS-89 board to OFF (pushed down).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.3 : Make the portion A to the maximum level.

CTL Head Position Adjustment

After the Adjustment

6. Adjust Drum Phase

Refer to Section 7-2-3.

7. Adjust Digital DT System

Refer to Section 7-2-5.

8. Adjust Analog DT System

Refer to Section 7-2-8.

9. Adjust the AT Head Position

Refer to Section 6-2-10.

6-2-6. AT Head Height Check and Adjustment (for MSW-A2000/A2000P/M2000/M2000P/M2000E/M2000EP)

Precautions

- The AT head height adjustment is closely related to the azimuth adjustment, head-to-tape contact adjustment, and head position adjustment.
  Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head height.
- For MSW-2000, perform Section 6-2-7.

Tools

- Alignment tape

CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.
(3) Turn on the power.

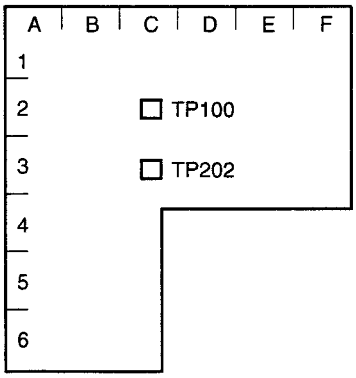
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Height

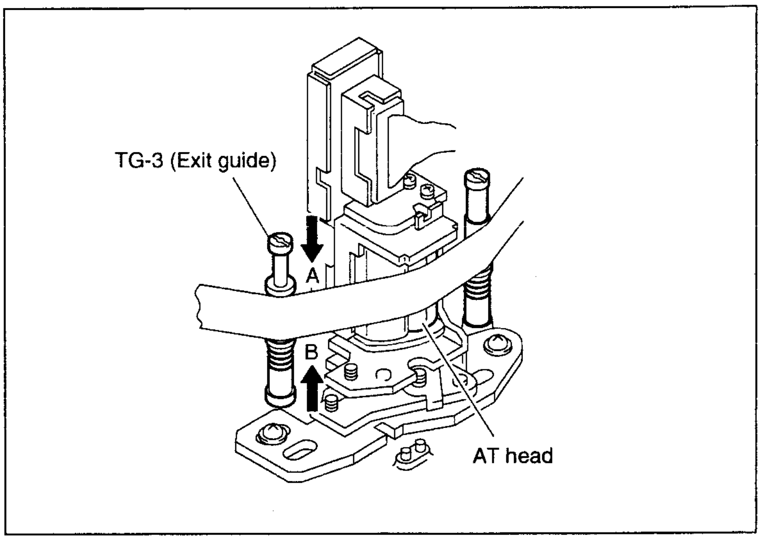
(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly press down the portion A of the tape shown in the figure, and check to see that both levels in CH-1 and CH-2 decrease by pressing the tape.

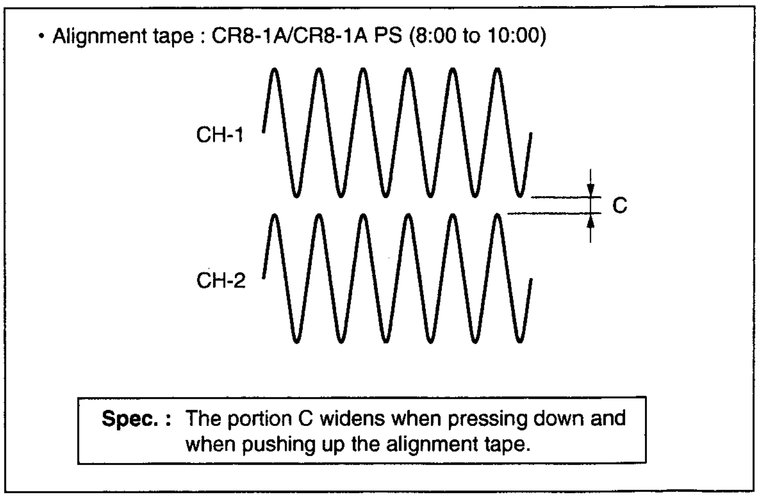
If both levels increase, perform step 4-Ⓐ.

(3) Slightly push up the portion B of the tape, and check to see that both levels in CH-1 and CH-2 decrease by pushing the tape.

If both levels increase, perform step 4-Ⓑ of next page.


TG-3 (Exit guide)
A
B
AT head

AT Head Height Check


• Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)
CH-1
C
CH-2
Spec. : The portion C widens when pressing down and when pushing up the alignment tape.

Specification

Adjustment

4. AT Head Height Adjustment

Ⓐ When both Levels Increase by Pressing Down the Tape

Turn the height adjustment screw clockwise so that both output level are maximum. (Fig. 1)
(Make the portion C minimize.)

Ⓑ When both Levels Increase by Pushing Up the Tape

(1) Turn the height adjustment screw counterclockwise to maximize both output levels from in CH-1 and CH-2. Turn the height adjustment screw counterclockwise furthermore to decrease the output level slightly. (Arrow ① in Fig. 2)

(2) Turn the height adjustment screw clockwise and adjust so that both output levels are maximum. (Arrow ② in Fig. 2)
(Make the portion C minimize.)

Note

To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved upward (with the height adjustment screw turned clockwise).

After the Adjustment

5. Adjust the AT Head Azimuth

Refer to Section 6-2-8.

6. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-2-9.

7. Adjust the AT Head Position

Refer to Section 6-2-10.

8. Recheck the AT Head Height

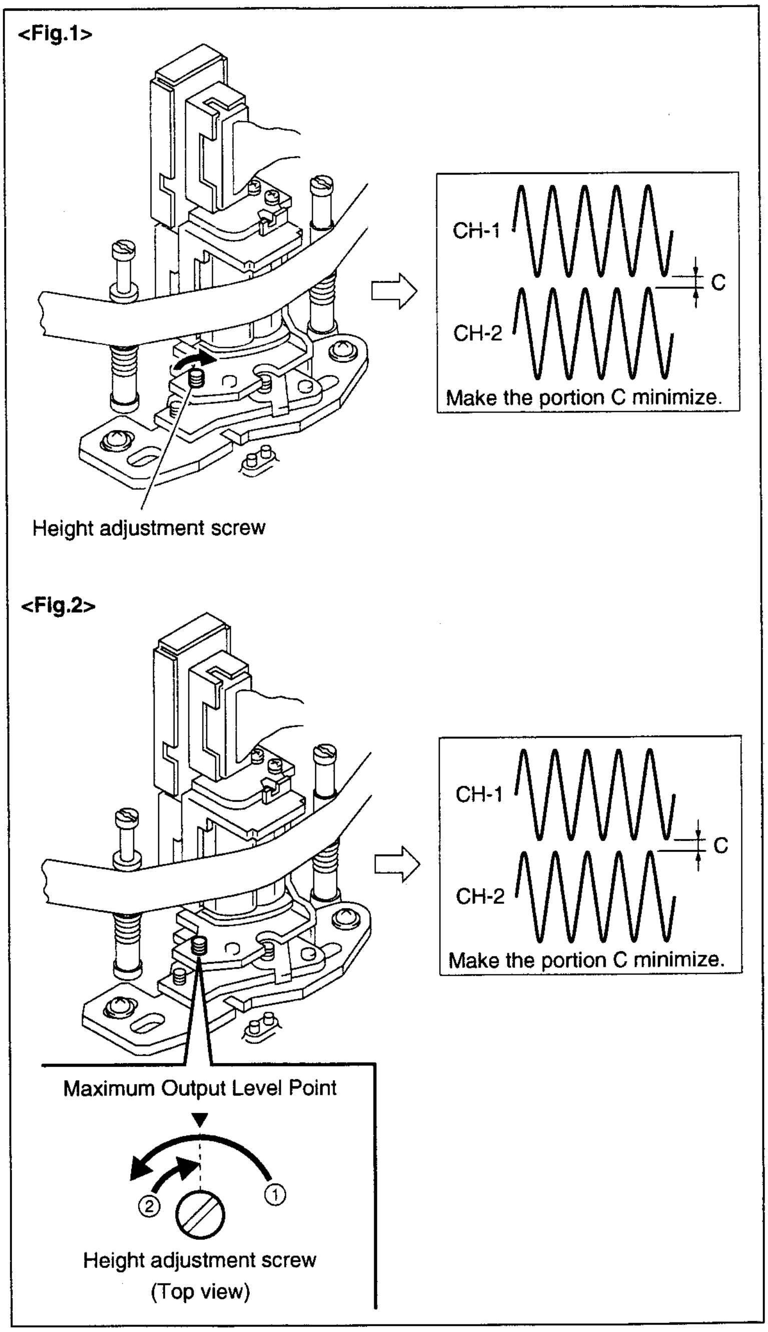
Refer to step 3 in this section.

9. Recheck the AT Head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.


<Fig.1>
CH-1
C
CH-2
Make the portion C minimize.
Height adjustment screw
<Fig.2>
CH-1
C
CH-2
Make the portion C minimize.
Maximum Output Level Point
②
①
Height adjustment screw
(Top view)

AT Head Height Adjustment

6-2-7. AT Head Height Check and Adjustment (for MSW-2000)

Precautions

- Perform the audio head height adjustment using TC track because of the LAU audio track is not provided in MSW-2000.
  Be sure to perform the AT head position adjustment (or check) after adjusting the AT head height.
- For MSW-A2000/A2000P/M2000/M2000P/M2000E/M2000EP, perform Section 6-2-6.

Tools

- Alignment tape
  MR2-1P: 8-960-077-61
- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

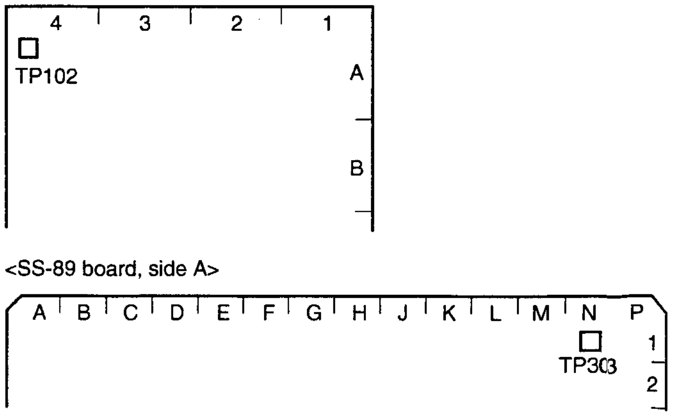
Connect the oscilloscope as follows:
CH-2: TP102/TC-104 board (TC PB)
TRIG: TP303/SS-89 board (CF4)
Oscilloscope setting:
CH-2: 100 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>

<SS-89 board, side A>



Preparation

Check

3. Check the AT Head Height

(1) Play back the MR2-1P (0 : 00 to 15 : 00) in the PLAY mode.

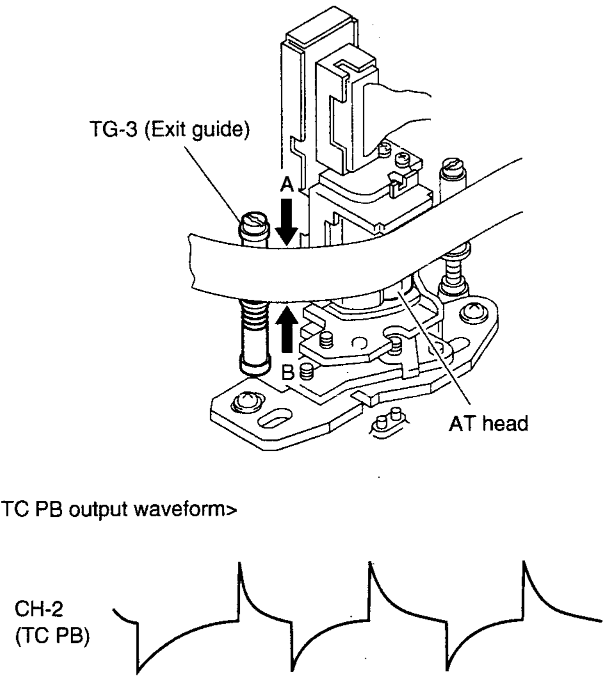
(2) Check that the level of CH-2 remains unchanged when portion A of the tape is lightly pushed downward.

If the level is changed, perform step 4.

(3) Check that the level of CH-2 decrease when portion B of the tape is lightly pushed up.

If the level increase, perform step 4.

- Alignment tape : MR2-1P (00:00 to 15:00)



Level remains unchanged by pushing the tape downward.
Level decreases by pushing the tape upward.

AT Head Height Check

Adjustment

4. Adjust the AT Head Height (Fig. 1)

(1) Turn the height adjustment screw so that the output level A is maximum (position "a").

(2) Gradually turn the height adjustment screw counterclockwise and stop where the output level starts to decrease (position "b").

Notes

- Never loosen or remove the azimuth adjustment screw.
- To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved from bottom to top (with the height adjustment screw turned clockwise).

5. Check the AT Head Height (Fig. 2)

While playing back an alignment tape MR2-1P (15 : 00 to 20 : 00), check that the waveform of TC data is output.

After the Adjustment

6. Adjust the AT Head Position

Refer to Section 6-2-10.

7. Recheck the AT Head Height

Refer to step 3 in this section.

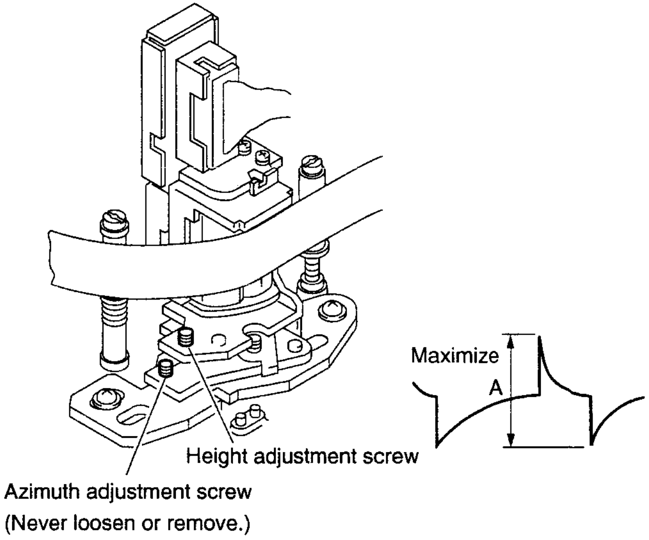
8. Recheck the AT Head Position

Refer to Section 6-2-10.

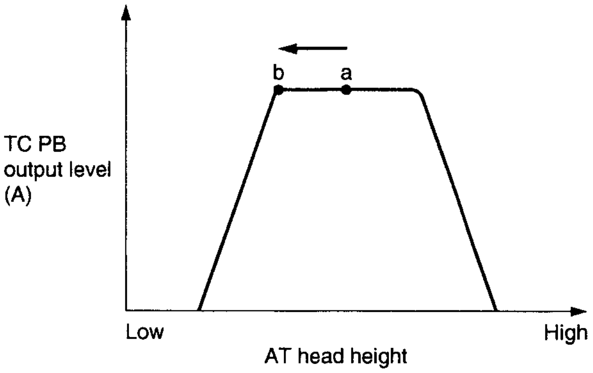
9. Apply the Locking Compound

Refer to Section 6-1-9.

<Fig. 1>

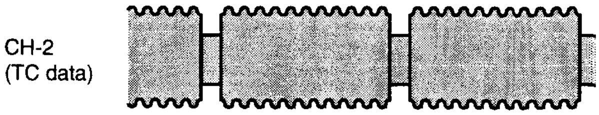


Gradually turn the height adjustment screw counterclockwise so that adjust the output level to position "b" from position "a".



<Fig. 2>

- Alignment tape : MR2-1P (15:00 to 20:00)



Outputs the waveform of TC data.

AT Head Height Adjustment

6-2-8. AT Head Azimuth Check and Adjustment

Note

MSW-2000 does not need performing this section.

Precaution

The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
Be sure to adjust (or check) these related portions according to “After the Adjustment” in this section after adjusting the AT head azimuth.

Tools

- Alignment tape

CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

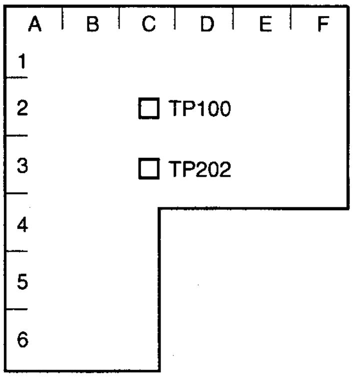
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 100 mV/DIV
CH-2: 100 mV/DIV
MODE: X-Y

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Azimuth

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Adjust the horizontal and vertical amplitudes of lissajous waveform displayed on the oscilloscope to six cm each.

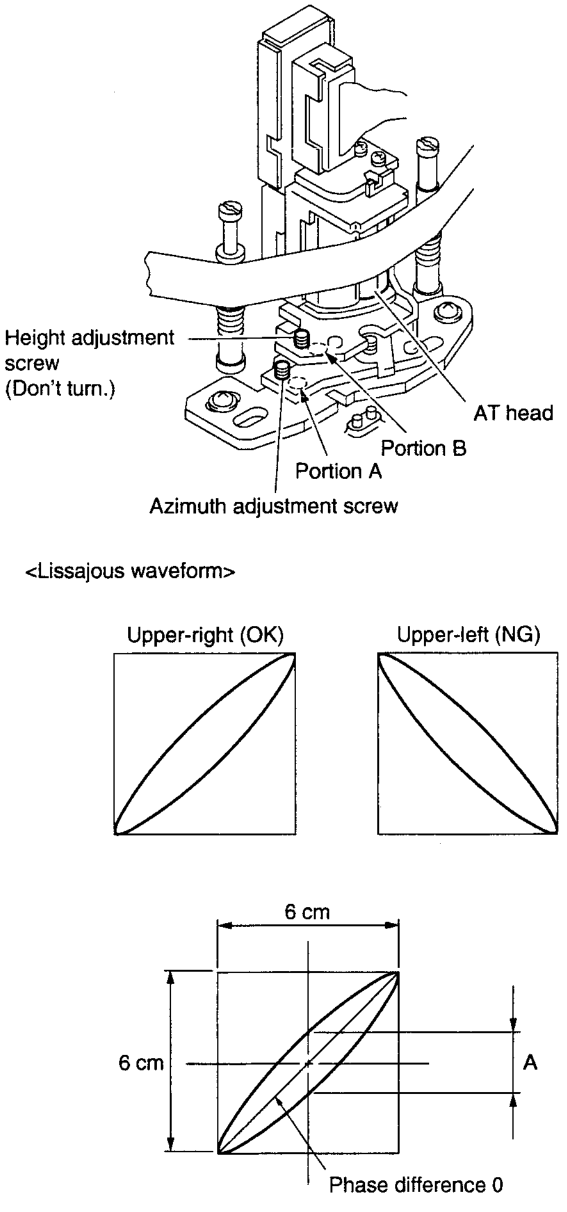
(3) Check that the lissajous waveform holds the upper-right shape.

(4) Check that the vertical amplitude at the center point in the horizontal direction satisfies the specification.

If the specification in figure is not satisfied, perform following steps 4 and later.

(5) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

- Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : A ≦ 0.52 cm

AT Head Azimuth Adjustment

Adjustment

4. Adjust the AT Head Azimuth

(1) Turn the azimuth adjustment screw so that the specification is satisfied.

(2) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

After the Adjustment

5. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-2-9.

6. Adjust the AT Head Position

Refer to Section 6-2-10.

7. Check the AT Head Height

Refer to Section 6-2-6.

8. Check the AT Head Azimuth

Refer to step 3 in this section.

9. Recheck the AT head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-2-9. AT Head Head-to-tape Contact Check and Adjustment

Note

MSW-2000 does not need performing this section.

Precaution

The AT head head-to-tape contact adjustment is closely related to the head position adjustment, head height adjustment, and head azimuth adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head head-to-tape contact.

Tools

• Alignment tape	
CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

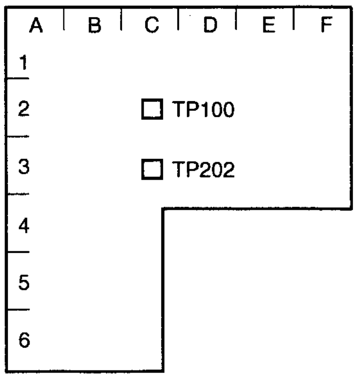
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

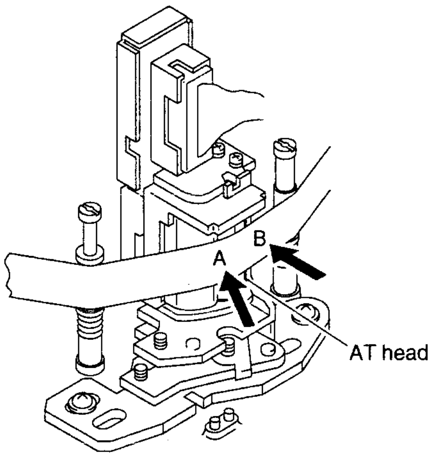
3. Check the AT Head Head-to-tape Contact

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

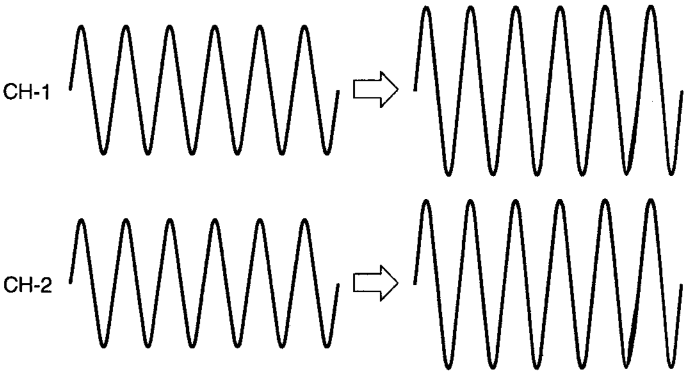
(3) Check that both increased amount of the output levels in CH-1 and CH-2 satisfy the specification.

If the specification is not satisfied, perform following steps 4 and later.



AT Head Head-to-tape Contact Check

• Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : Both increased amount of the output levels in CH-1 and CH-2 are within 5 %.

Specification

Adjustment

4. Adjust the AT Head Head-to-tape Contact

(1) Loosen the two head securing screws by 1/4 to 1/2 turn.
(2) Insert a 2 mm flatbladed screwdriver into the notch of the adjustment plate.
(3) Adjust the AT head position to maximize the output level.
(4) Tighten the two securing screws loosened in step (1).

Tightening torque: 19.6×10^{-2} N•m
{2 kgf•cm}

5. Recheck the AT Head Head-to-tape Contact

Perform to previous step 3 in this section again.

After the adjustment

6. Check the AT Head Position

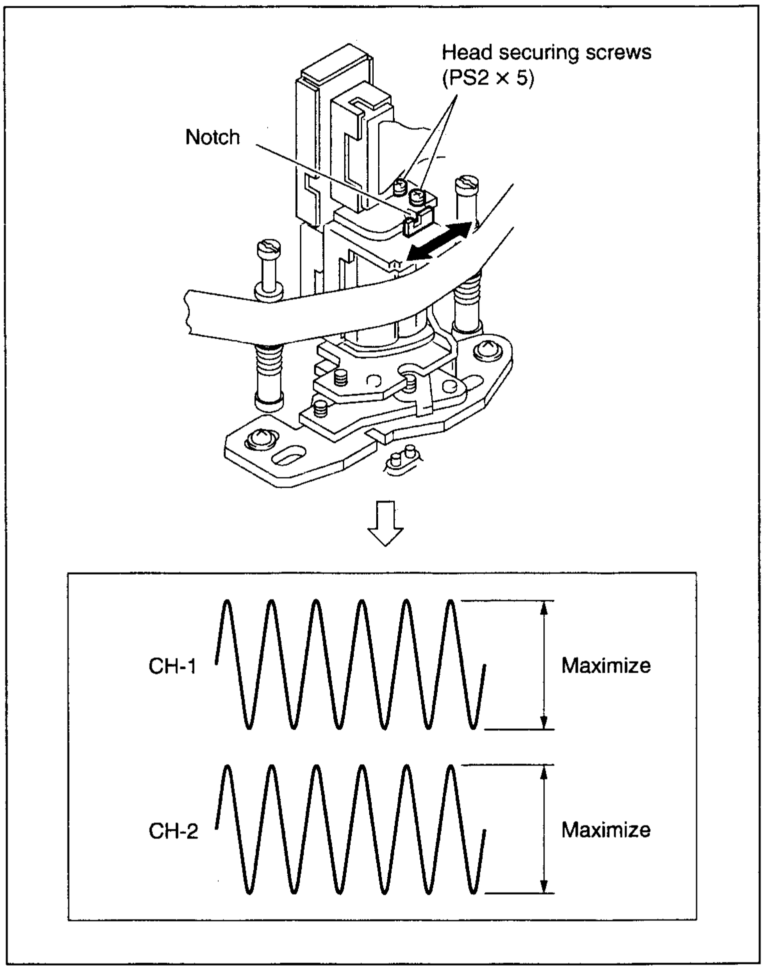
Refer to Section 6-2-10.

7. Check the AT Head Height

Refer to Section 6-2-6.

8. Check the AT Head Azimuth

Refer to Section 6-2-8.



AT Head Head-to-tape Contact Adjustment

6-2-10. AT Head Position Check and Adjustment

Precautions

- The CTL head position adjustment should be completed before performing this adjustment. The AT head position is adjusted relative to the CTL head position as reference.
- The AT head position adjustment is closely related to the head height adjustment, head azimuth adjustment, and head-to-tape contact adjustment. Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head position.

Tools

• Alignment tape MR2-1P:	8-960-077-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape MR2-1P, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

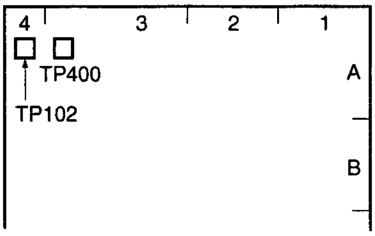
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
CH-2: TP102/TC104 board (TC PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
CH-2: 2 V/DIV
TIME: 10 ms to 500 μs/DIV

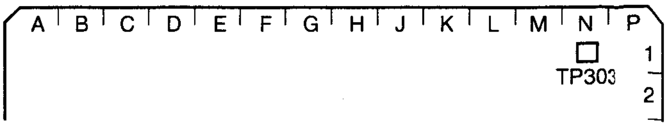
- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>



<SS-89 board, side A>



Preparation

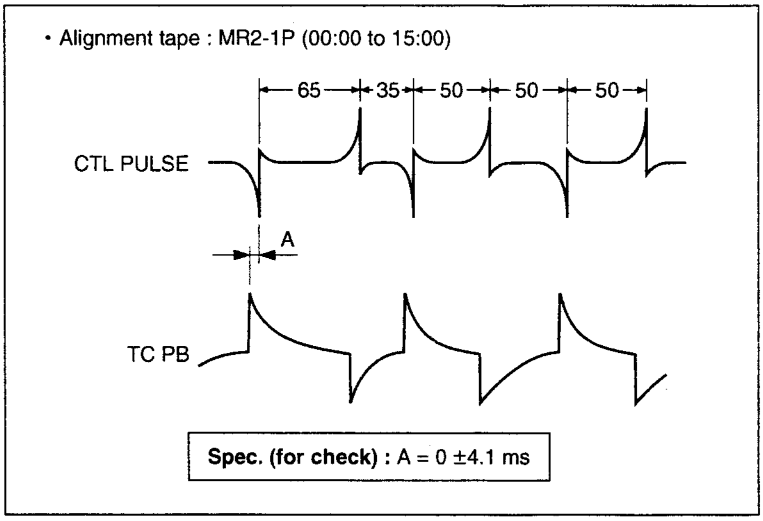
Check

3. Check the AT Head Position

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the positional relationship between the rising edges of CTL's 65:35 pulse and TC PB's 65:35 waveform signals satisfies the specification.

If the specification is not satisfied, perform following steps 4 and later.



- Alignment tape : MR2-1P (00:00 to 15:00)

Spec. (for check) : A = 0 ±4.1 ms

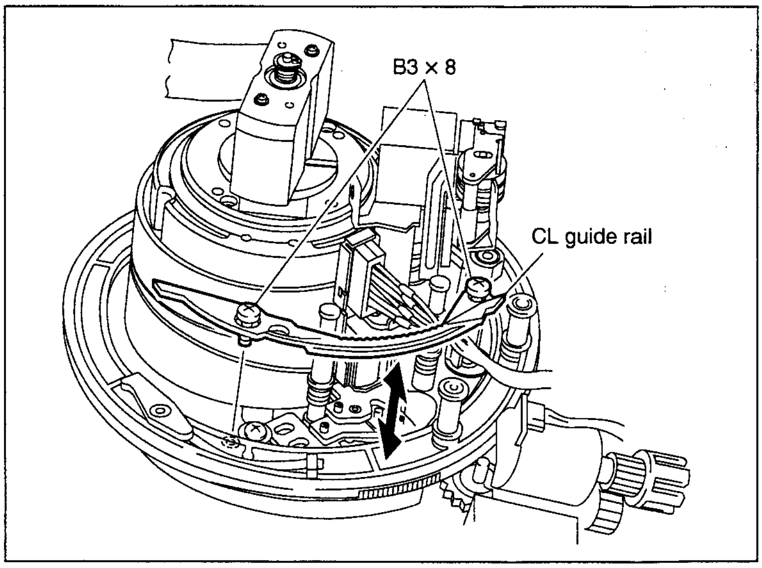
AT Head Position Check

Adjustment

4. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws, then remove the CL guide rail.



CL Guide Rail Removal/Reattachment

5. Adjust the AT Head Position

(1) Loosen the two securing screws of the AT head assembly by 1/4 to 1/2 turn.

(2) Turn on the power, then play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Insert a 3 mm flatbladed screwdriver into the notch of the AT head assembly.

(4) Adjust the AT head assembly position so that the specification is satisfied.

Note

The specifications in AT head position check and position adjustment differ. When adjusting, apply the specification in AT head position adjustment.

(5) Tighten the two screws loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf•cm}

6. Recheck the AT Head Position

Perform previous step 3 in this section again.

7. Attach the CL Guide Rail

(1) Turn off the power, then remove the alignment tape.

(2) Attach the CL guide rail with two screws.

After the Adjustment

8. Check the AT Head Height

Refer to Section 6-2-6 or 6-2-7.

9. Check the AT Head Azimuth

Refer to Section 6-2-8.

10. Check the AT Head Head-to-tape Contact

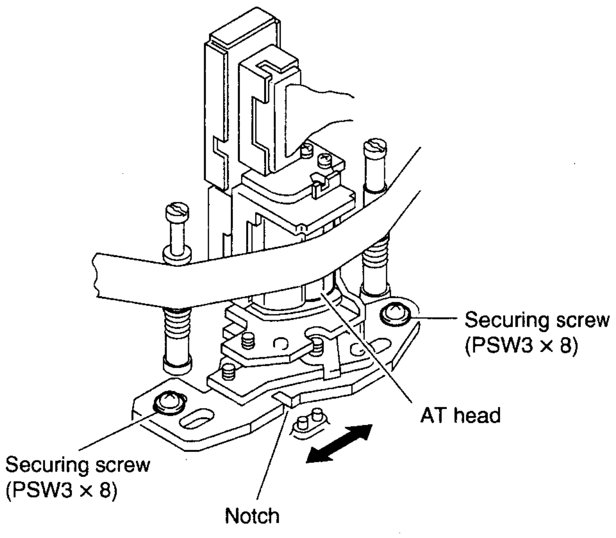
Refer to Section 6-2-9.

11. Check the AT Head Position

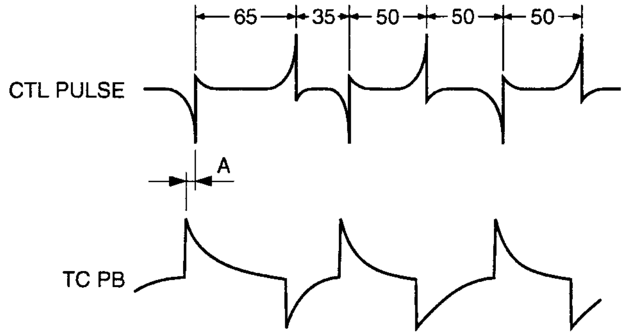
Refer to step 3 in this section.

12. Apply the Locking Compound

Refer to Section 6-1-9.



• Alignment tape : MR2-1P (00:00 to 15:00)



Spec. (for adjustment) : A = 0 ±0.6 ms

AT Head Position Adjustment

6-2-11. Audio Level Check and Adjustment in REV Mode

Note

MSW-2000 does not need performing this section.

Tools

- Alignment tape
  CR8-1A (for 525): 8-960-097-45
  CR8-1A PS (for 625): 8-960-098-45
- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.
(3) Turn on the power.

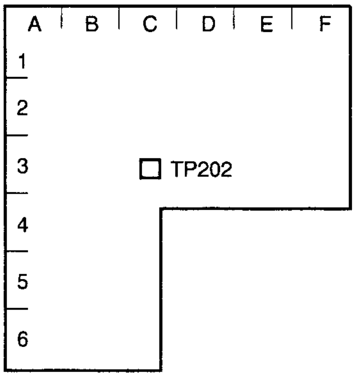
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP202/AE-31 board (CH-2 PB signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

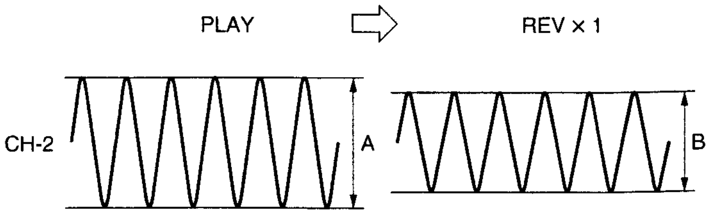
Check

3. Check the Audio Output Level

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS.
(2) Check the audio output level A in CH-2.
(3) Set the REV × 1 mode.
(4) Check that the audio output level B in CH-2 satisfies specification 1.

If specification 1 is not satisfied, perform following steps 4 and later.

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec.1 : $\frac{B}{A} \times 100 \geqq 90$ %

Audio Level Check in REV Mode

Adjustment

4. Adjust the TG-5 (Threading Roller) Height

(1) Play back the 1 kHz, 0 VU signal portion on the alignment tape CR8-1A/CR8-1A PS (8:00 to 10:00).

(2) Set the REV × 1 mode.

(3) Slightly press down the portion A of the tape shown in figure, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 clockwise using a tape guide adjustment driver.

(4) Slightly push up the portion B of the tape, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 counterclockwise using the tape guide adjustment driver.

(5) Check the output level satisfies specification 1 (previous page).

If the specification 1 is not satisfied, repeat steps (1) through (4) mentioned above.

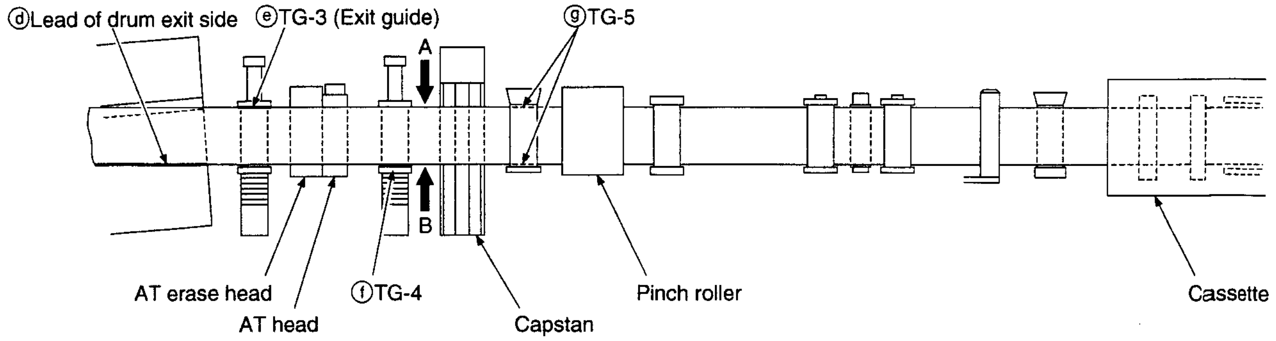
5. Check the Tape-running at Tape Exit Side

In the following modes, check that the tape-running condition satisfies specification 2.

- PLAY mode
- REV × 1 mode

If specification 2 is not satisfied, adjust the tape guides height at the tape exit side. (Refer to step 7 (at the Tape Exit Side) in Section 6-7-2.)

If the height of the tape guide is adjusted, perform the video tracking check.
(Refer to Section 6-2-1.)

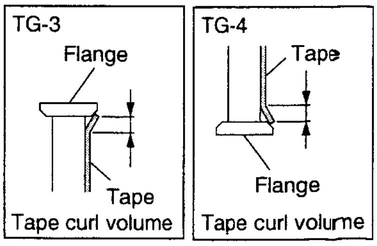


Spec.2 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5
The tape runs without any curl at the upper and lower flanges.



Audio Level Adjustment in REV Mode

6-3. MSW Player Tape Path

Applicable models: MSW-M2100/M2100P/M2100E/M2100EP

6-3-1. Video Tracking Check

Tools

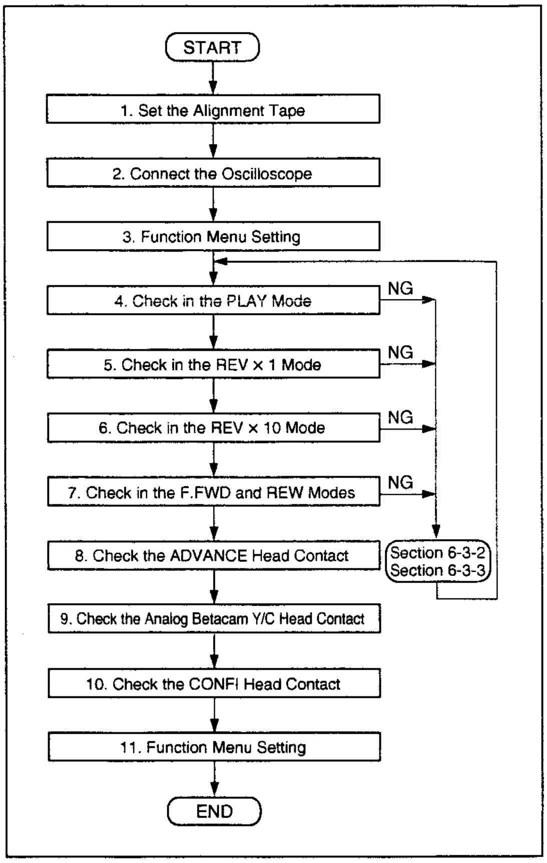
- Alignment tapes

MR2-1P (for both 525 and 625):	8-960-077-61
MR5-1 (for 525):	8-960-077-01
MR5-1P (for 625):	8-960-077-51
CR2-1B (for 525):	8-960-096-01
CR2-1B PS (for 625):	8-960-096-51

- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment screwdriver (MW-261): J-6322-610-A

Note

When checking video tracking, the RF envelope waveform (PLAY mode) should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments only when without the specifications.


START
1. Set the Alignment Tape
2. Connect the Oscilloscope
3. Function Menu Setting
4. Check in the PLAY Mode
NG
5. Check in the REV x 1 Mode
NG
6. Check in the REV x 10 Mode
NG
7. Check in the F.FWD and REW Modes
NG
8. Check the ADVANCE Head Contact
Section 6-3-2
Section 6-3-3
9. Check the Analog Betacam Y/C Head Contact
10. Check the CONFI Head Contact
11. Function Menu Setting
END

Video Tracking Check/Adjustment Flow Chart

Setting

1. Set the Alignment Tape

(1) Press the switch S300 on the SS-89 board during power-on to set the reel tables to the S cassette position.
(2) Turn off the power.
(3) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.

2. Connect the Oscilloscope

- Connect the oscilloscope as follows:

CH-1: TP701/EQ-84 board (CNF AC ENV signal)
CH-2: TP102/EQ-84 board (CNF AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

- Oscilloscope setting:

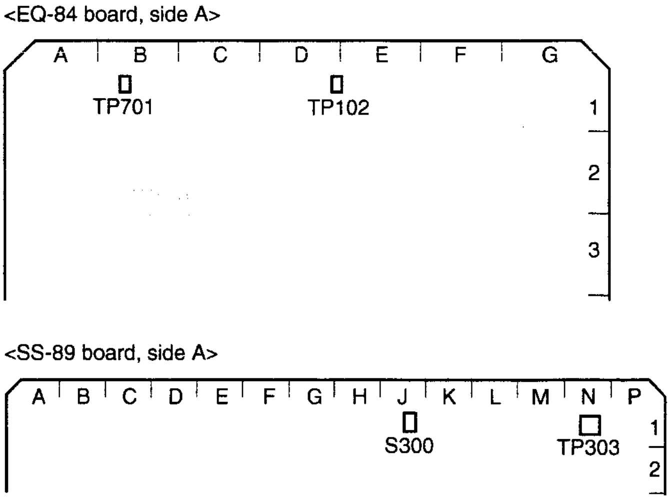
CH-1: 500 mV to 1 V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

3. Function Menu Setting

Turn on the power, then set the F1 (CAPSTN) of function menu Page4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)

- Connection of the oscilloscope

CH-1 : TP701/EQ-84 board (CNF AC ENV signal)
CH-2 : TP102/EQ-84 board (CNF AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)



Preparation

Check

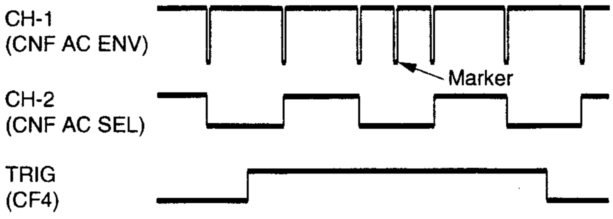
4. Check in the PLAY Mode

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

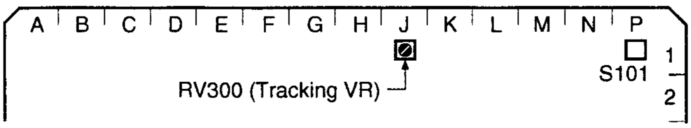
(2) Check that the RF envelope waveform with the marker as shown in the figure appears following the positive slope of the CF4 signal.
Use this portion of the RF envelope waveform when checking video tracking in the PLAY mode.
If extremely abnormal waveform (Fig. 1) is output after replacing the upper drum assembly, remove and re-attach the upper drum assembly.
- Refference:
  Section 5-2. Upper Drum Assembly Replacement

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

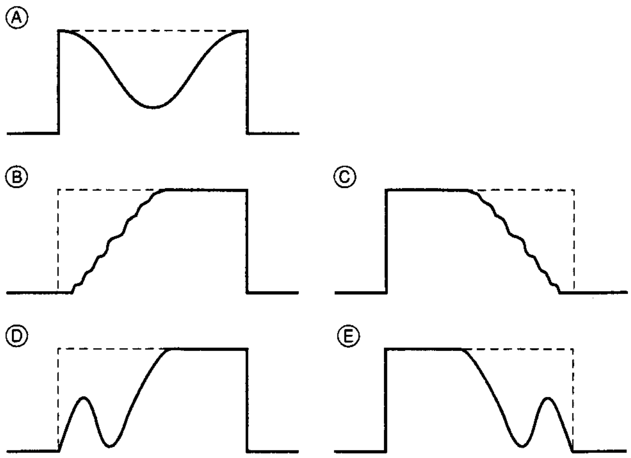
- Alignment tape : MR2-1P (00:00 to 15:00)


CH-1
(CNF AC ENV)
Marker
CH-2
(CNF AC SEL)
TRIG
(CF4)

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300 (Tracking VR)
S101
1
2

<**Fig.1** : NG waveforms of AC ENV signal (Examples)>



(4) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(5) In the step (4) state, check to see that the RF envelope waveform satisfies specification 1.

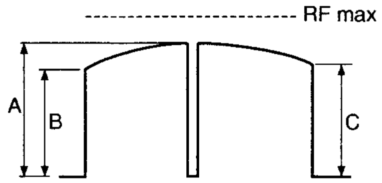
Note

If the level fluctuates, read the average value.

(6) If the level fluctuates, rotate the tracking VR to maximize the output level at the center of the RF envelope waveform, and check that the fluctuation amount satisfies specification 2.

If specifications 1 and 2 are not satisfied, perform the adjustment in the Section 6-3-2 (Tape Entrance Side) or Section 6-3-3 (Tape Exit Side).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)
  <Head-to-tape contact>

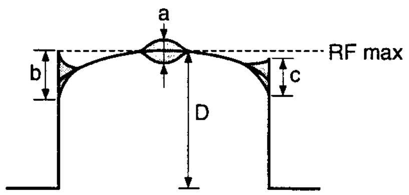


A = RF max × 0.8

Spec.1 : Output levels (B and C) at the tape entrance side and exit side are more than 70 % of the center level (A).

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$

<Fluctuation>



D = Average maximum level at waveform center

Spec.2 : Fluctuation amounts (a, b, c) at the drum center portion, entrance side and exit side are less than 20 % of the average maximum level (D).

$\frac{a}{D} \times 100 \leqq 20\ \%$ $\frac{b}{D} \times 100 \leqq 20\ \%$ $\frac{c}{D} \times 100 \leqq 20\ \%$

Video Tracking Check (PLAY)

5. Check in the REV × 1 Mode

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(2) Connect the oscilloscope as follows:

CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP100 EQ-84 board
(ADV AC SEL signal)
TRIG: TP303/ SS-89 board
(CF4 signal)

(3) Play back the alignment tape MR2-1P (00:00 to 15:00).

(4) Set the REV × 1 mode, and check that the RF envelope waveform satisfies specification 3.

If the waveform at the entrance is without the specification 3, adjust tracking at the drum entrance. (Refer to Section 6-3-2.)
If the waveform at the exit is NG, adjust the height of TG-5 before tracking adjustment.

Note

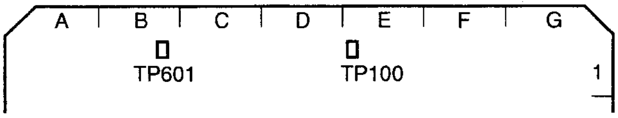
Adjusting the height of TG-5
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

If the specification is still not satisfied, adjust tracking at the drum exit. (Refer to Section 6-3-3.)

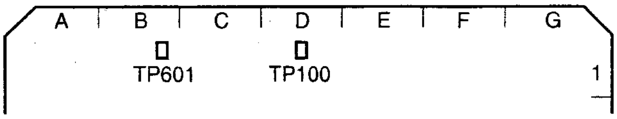
- Connector of the osilloscope

CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP100/EQ-84 board (ADV AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

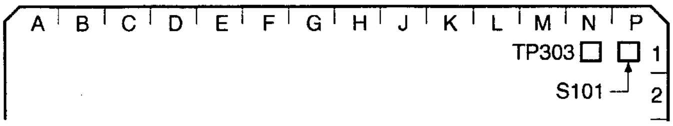
<EQ-84 board, side A>
Board No.suffix 12



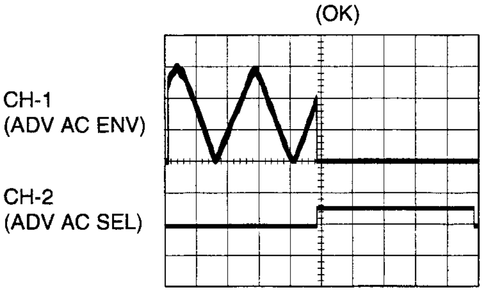
Board No.suffix 13 and higher



<SS-89 board, side A>



- Alignment tape : MR2-1P (00:00 to 15:00)
S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.3 : Appears waveforms with no lacking.
Uniform waveforms without variation.

(5) Also check that the tape is running with maintaining the state of the specification 4.

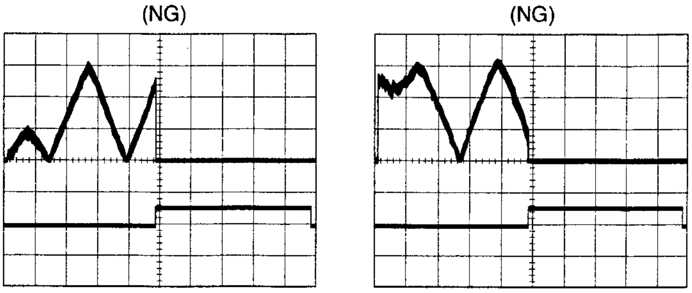
If specification 4 is not satisfied, first adjust the height of TG-5.

Note

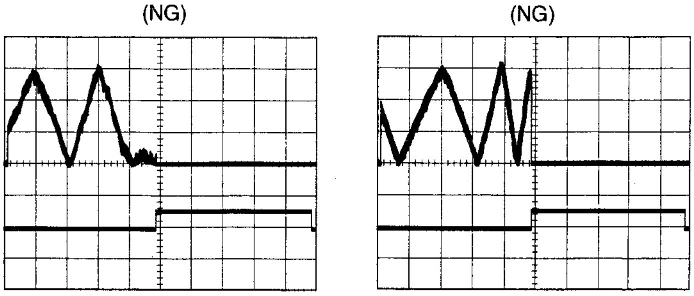
Adjusting the height of TG-5
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

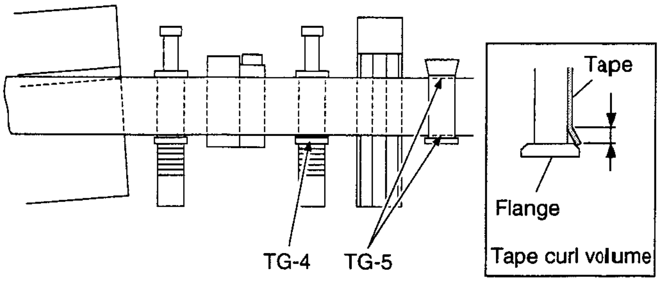
When the specification 4 is not still satisfied even after adjusting the height of TG-5, adjust the tracking at tape exit. (Refer to Section 6-3-3.)

- In the case of the drum entrance side is NG (Example) :



- In the case of the drum exit side is NG (Example) :





Spec.4 : Lower flange of TG-4
The tape curl is less than 1/10 of the tape width.

Video Tracking Check (REV × 1)

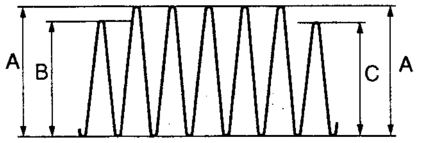
6. Check in the REV × 10 Mode

(1) Play back the alignment tape MR2-1P (00:00 to 15:00).

(2) Set the REV × 10 mode, and check that the RF envelope waveform satisfies specification 5.

If specification 5 is not satisfied, perform the adjustment in the Section 6-3-2 (Tape Entrance Side) or Section 6-3-3 (Tape Exit Side).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.5 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)

Video Tracking Check (REV × 10)

7. Check in the F.FWD and REW Modes

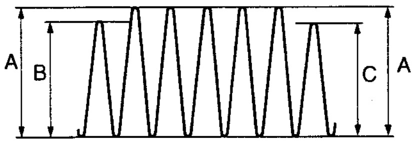
(1) Play back the alignment tape MR2-1P (00:00 to 15:00).

(2) Set the F.FWD mode, and check that the RF waveform satisfies specification 6 and specification 7.

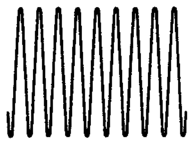
(3) Set the REW mode, and check that the RF waveform satisfies specification 6 and specification 7.

If specifications 6 and 7 are not satisfied, perform the adjustment in the Section 6-3-2 (Tape Entrance Side) or Section 6-3-3 (Tape Exit Side).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.6 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)



Spec.7 : Appears waveforms with no lacking.

Video Tracking Check (F.FWD, REW)

8. Check the ADVANCE Head Contact

(1) Connect the oscilloscope as follows:
  CH-1: TP601/EQ-84 board (ADV AC ENV signal)
  CH-2: TP1601/ EQ-84 board (ADV BD ENV signal)
  TRIG: TP100/ EQ-84 board (ADV AC SEL signal)

(2) Play back the alignment tape MR5-1/MR5-1P in the PLAY mode.

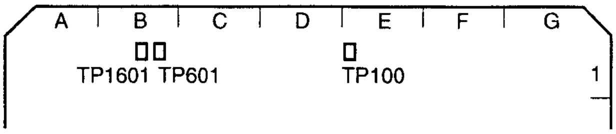
(3) Check that the RF envelope waveforms of ADV AC ENV and ADV BD ENV satisfy specification 8.

(4) Turn off the power, then remove the alignment tape.

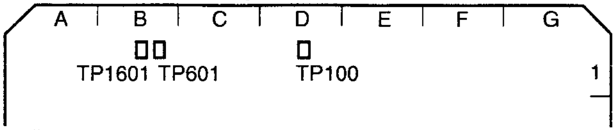
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

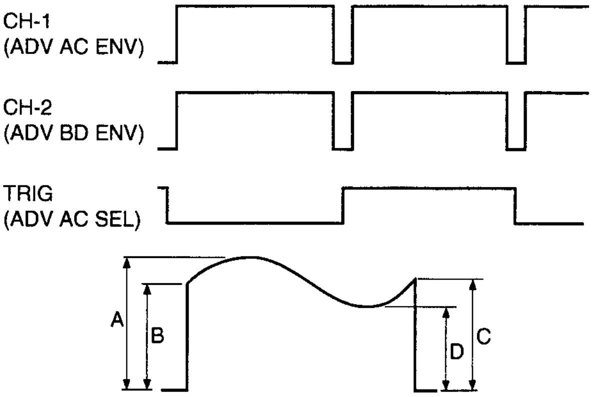
<EQ-84 board, side A>
Board No.suffix 12



Board No.suffix 13 and higher



- Alignment tape : MR5-1/MR5-1P
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Speck.8 : The whole waveform should be 70 % output or more than the maximum level.
$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$ $\frac{D}{A} \times 100 \geqq 70\ \%$
B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

ADVANCE Head Contact Check

9. Check the Analog Betacam Y/C Head Contact

(1) Set the oscilloscope as follows:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(2) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(3) Set Bit-1, Bit-2 and Bit-3 of DIP switch S101 on the SS-89 board to ON (pushed up).

(4) Turn on the power, then play back CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

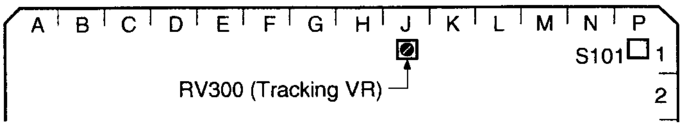
(5) Rotate the tracking VR (RV300/SS-89) to maximize the level at the center of the RF envelope waveform.

(6) Check that the RF envelope waveform is output in each channel.
Check that the Ya and Ca RF envelope waveforms satisfy specification 9.

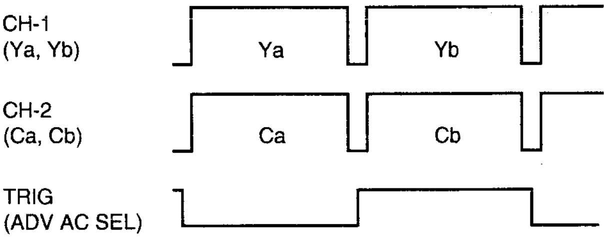
(7) Turn off the power, then remove CR2-1B/CR2-1B PS.

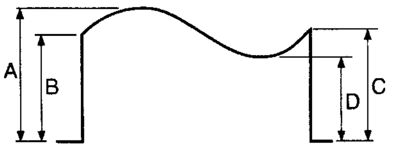
(8) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
  S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.9 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A}\times 100 \geqq 75\ \%$ $\frac{C}{A}\times 100 \geqq 75\ \%$ $\frac{D}{A}\times 100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

Analog Betacam Y/C Head Contact Check

10. Check the CONFI Head Output

(1) Connect the oscilloscope as follows:

CH-1: TP701/EQ-84 board
(CNF AC ENV signal)
CH-2: TP1701/ EQ-84 board
(CNF BD ENV signal)
TRIG: TP102/ EQ-84 board
(CNF AC SEL signal)

Oscilloscope setting:
CH-1: 500 mV/DIV
CH-2: 500 mV/DIV
TRIG: 5 V/DIV
TIME: 5 ms

(2) Set the alignment tape MR5-1/MR5-1P and put a weight (about 1000 g) onto it.

(3) Play back the alignment tape in the PLAY mode.

(4) Check that the CNF AC ENV waveform satisfies specification 10.

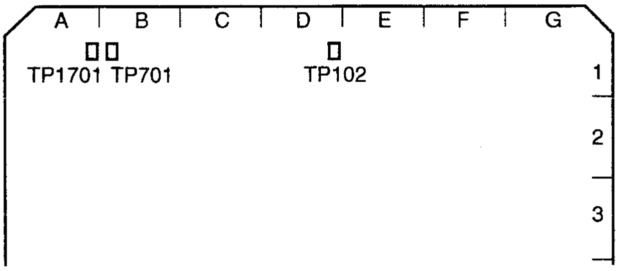
11. Function Menu Setting

Turn on the power, then return F1 (CAPSTN) of function menu Page 4 to the customer setting.

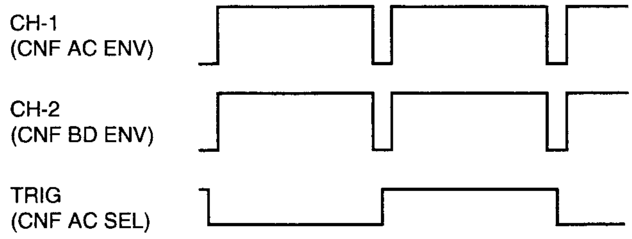
- Connection of the oscilloscope

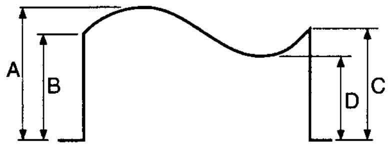
CH-1 : TP701/EQ-84 board (CNF AC ENV signal)
CH-2 : TP1701/EQ-84 board (CNF BD ENV signal)
TRIG : TP102/EQ-84 board (CNF AC SEL signal)

<EQ-84 board, side A>



<CONFI output waveform>





Spec.10 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$ $\frac{D}{A} \times 100 \geqq 70\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

CONFI Head Output Check

6-3-2. Tracking Adjustment at the Tape Entrance Side

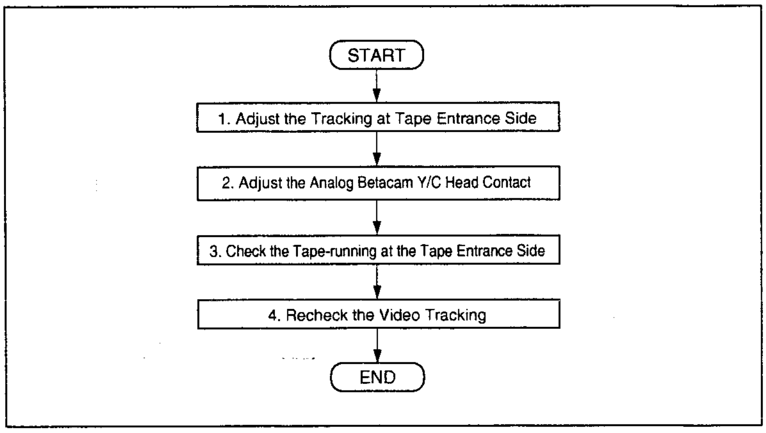
This adjustment should be performed when the specifications have not been satisfied in Section 6-3-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-3-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat to the entrance and exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the followings:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.


START
1. Adjust the Tracking at Tape Entrance Side
2. Adjust the Analog Betacam Y/C Head Contact
3. Check the Tape-running at the Tape Entrance Side
4. Recheck the Video Tracking
END

Flow Chart of Tracking Adjustment at the Tape Entrance Side

1. Adjust the Tracking at the Tape Entrance Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

(2) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level. (Fig. 1)

(4) Loosen the height adjustment nut of TG-2 so that the tape does not in contact the upper flange. (Fig. 2)

(5) Rotate the height adjustment nut of TG-1 to flatten the RF envelope waveform. (Fig. 1)

If the waveform does not become flat, perform the following adjustment (① to ③).

① Clean the lower drum lead with a wooden stick. (Refer to Section 4-2-4.)

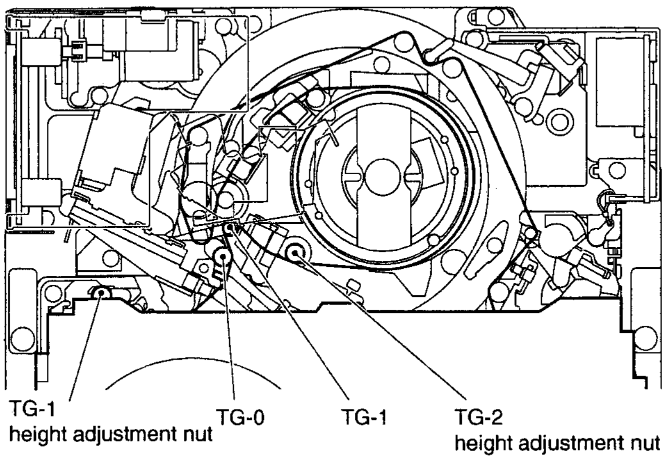
② While running the tape, press the tape lightly with the wooden stick and check that the tape does not float from the lead.

③ Adjust the height of TG-1 so that the RF envelope waveform becomes as flat as possible within the scope of Specification 11 in Fig. 3.

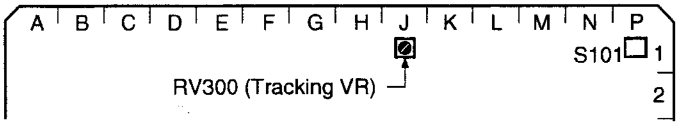
(6) Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 4)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

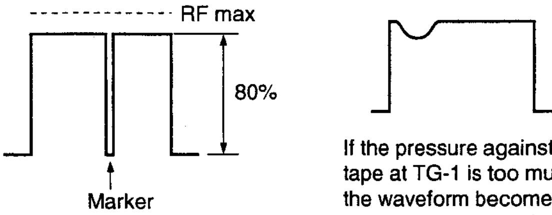

TG-1
height adjustment nut
TG-0
TG-1
TG-2
height adjustment nut

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
S101
1
2
RV300 (Tracking VR)

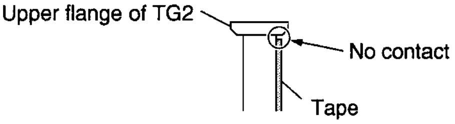
- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>

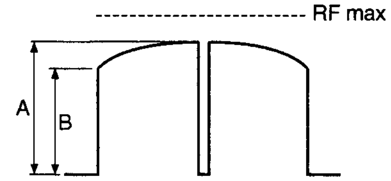

RF max
80%
Marker

If the pressure against the tape at TG-1 is too much, the waveform becomes as shown in the upper figure. (NG)

<Fig.2>


Upper flange of TG2
No contact
Tape

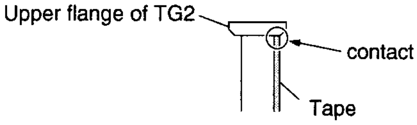
<Fig.3>



A = RF max × 0.8

Spec.11: $\frac{B}{A} \times 100 \geqq 70\ \%$

<Fig.4>


Upper flange of TG2
contact
Tape

Tracking Adjustment at Tape Entrance Side (PLAY)

2. Adjust the Analog Betacam Y/C Head Contact

(1) Turn off the power, then remove the alignment tape.

(2) Connect the oscilloscope as follows:

CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)

Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(3) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(4) Set Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(5) Turn on the power, then playback the CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(6) Turn the tracking VR (RV300/SS-89 board) so that the center portion of the RF envelope waveform becomes the maximum output level.

(7) Check that the RF envelope waveform is output in each channel. Check that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 12.

If specification 12 is not satisfied, perform step (12) and later.

(8) Turn off the power, then remove the alignment tape CR2-1B/CR2-1B PS.

(9) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

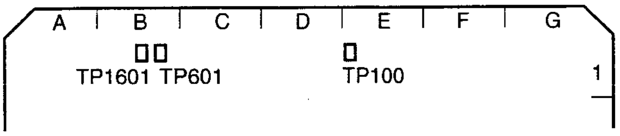
(10)Set the alignment tape MR2-1P and put the weight (approx. 1000 g) onto it.

(11)Turn on the power, then perform following step 3 and later.

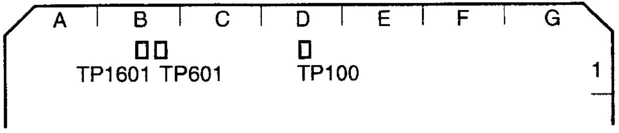
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

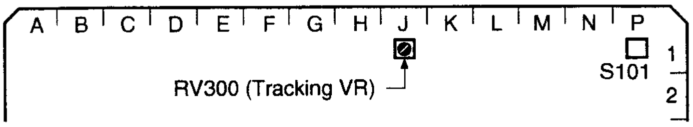
<EQ-84 board, side A>
Board No.suffix 12



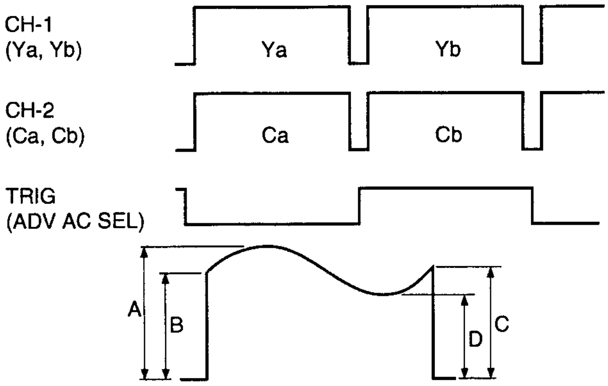
Board No.suffix 13 and higher



<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)



Spec.12 : The whole waveform should be 75 % output or more than the maximum level.
$\frac{B}{A} \times 100 \geqq 75\%$ $\frac{C}{A} \times 100 \geqq 75\%$ $\frac{D}{A} \times 100 \geqq 75\%$
B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

(12)Loosen the height adjustment nut of TG-2 so that the tape does not touch the upper flange. (Fig. 5)

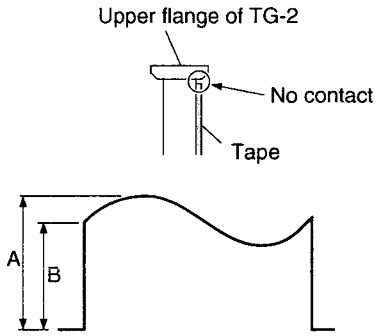
(13)Rotate the height adjustment nut of TG-1 and adjust so that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 13.

(14)Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 6)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

<Fig.5>

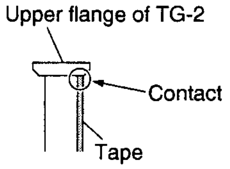


Spec.13 : The output of the entrance waveform must be 80 % of maximum value.

$\frac{B}{A}$ × 100 = 80 % (Not B/A x 100 > 80 %)

However if the outputs of the entrance waveform of the Ya RF envelope waveform and Ca RF envelope waveform are both not 80 % of the maximum value, adjust so that the RF envelope with the smaller entrance waveform output becomes 80 % of the maximum value.

<Fig.6>



Analog Betacam Y/C Head Contact Adjustment

(15)Turn off the power, then remove the CR2-1B/CR2-1B PS.

(16)Reset Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(17)Connect the oscilloscope as follows:

CH-1: TP701/EQ-84 board
(CNF AC ENV signal)
CH-2: TP102/EQ-84 board
(CNF AC SEL signal)
TRIG: TP303/SS-89 board
(CF4 signal)

(18)Change the oscilloscope setting as follows:

CH1: 500 mV to 1V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

(19)Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.

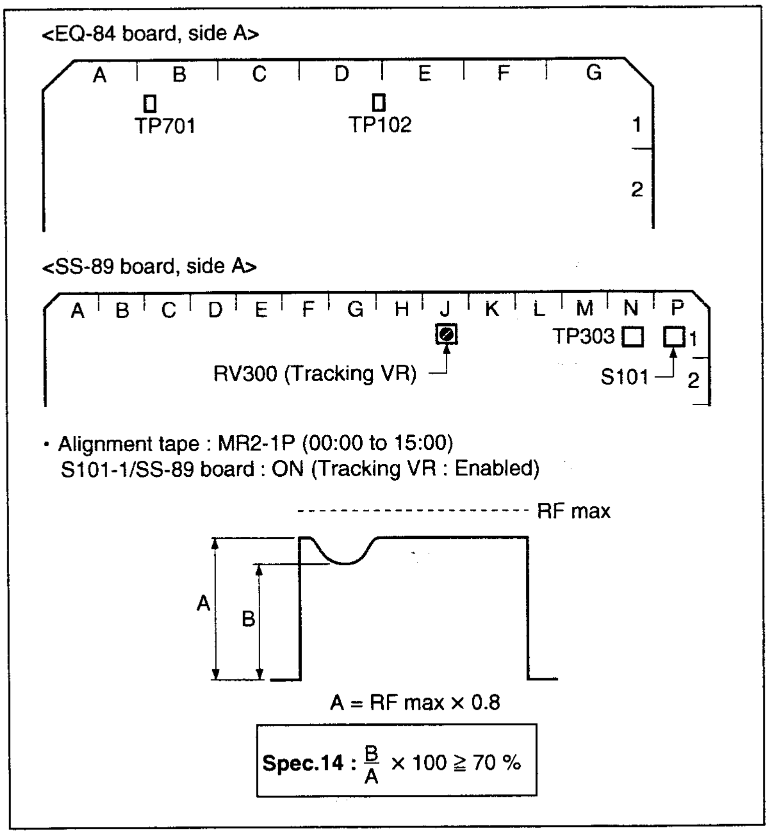
(20)Turn on the power, then play back the alignment tape (00:00 to 15:00) in the PLAY mode.

(21)Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(22)Check that the levels A and B shown in the figure satisfy specification 14.

(23)Reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

If specification 14 is not satisfied, perform the adjustment from (3) of step 1 and later again.



- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

A = RF max × 0.8

Spec.14 : $\frac{B}{A} \times 100 \geqq 70\ \%$

Tracking Adjustment

3. Check the Tape-running at the Tape Entrance Side

(1) Check the tape-running at the tape entrance side in each of the following modes:

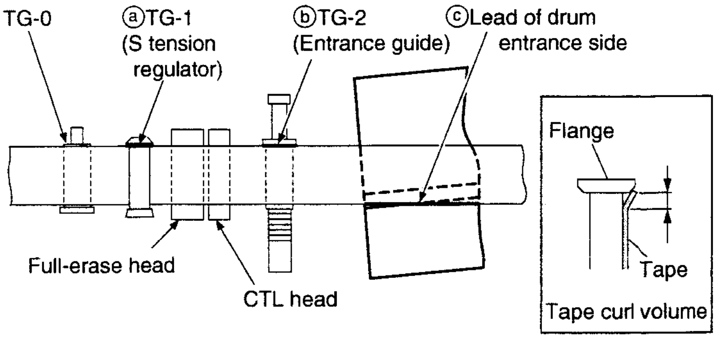
- PLAY mode
- F.FWD mode

If the curl of any of the tape guides does not satisfy specification 15, perform the adjustment from (3) of step 1 and later again.

(2) Check the tape-running at the tape entrance in each of the following modes:

- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the curl of any of the tape guides does not satisfy specification 16, perform the adjustment from (3) of step 1 and later again.



Spec.15 : ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.16 : ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at the Tape Entrance Side

4. Recheck the Video Tracking

Perform steps from 3 to 11 in Section 6-3-1.

Note

After adjusting, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-3-3. Tracking Adjustment at the Tape Exit Side

This adjustment should be performed when the specifications have not been satisfied in Section 6-3-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-3-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the following:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

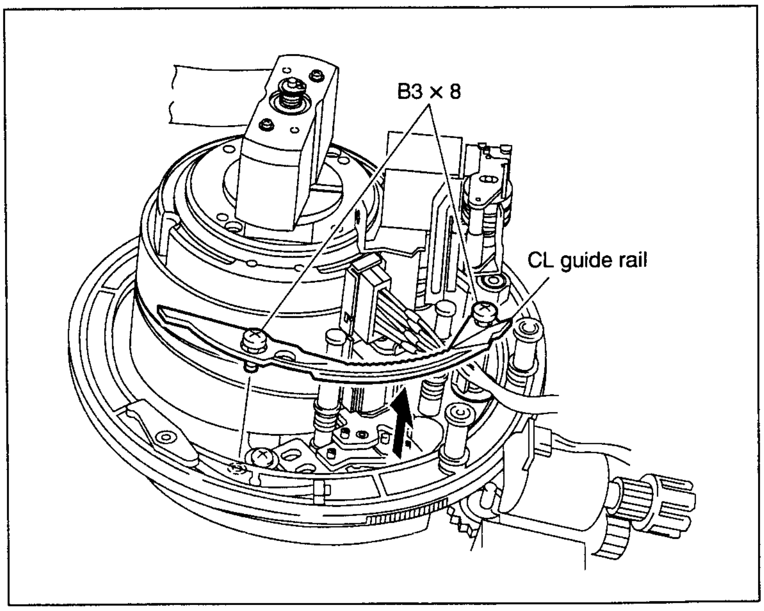
Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.

1. Remove the CL Guide Rail

(1) Turn off the power.
(2) Fully loosen the two screws to remove the CL guide rail.

Note

Do not pull out the screws because the screw holes on the CL guide rail are shaped in such a way to prevent screws from falling.



CL Guide Rail Removal

2. Adjust the Tracking at the Tape Exit Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(2) Turn on the power, then play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) to set the center of the RF envelope waveform to the maximum output level.

(4) Turn the height adjustment nut of TG-3 counterclockwise by one to two turns so that the tape does not in contact with the upper flange of TG-3.

Note

Don't turn excessively the nut, or the tape bottom edge does in contact with the lower flange of TG-3.

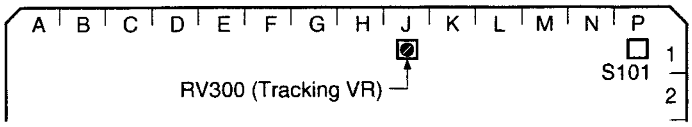
(5) Turn the height adjustment nut of TG-4 clockwise so that the tape does not in contact with the lower flange of TG-4.

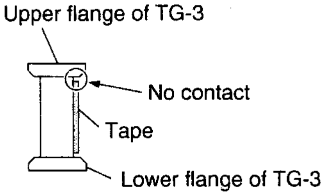
(6) Check that the RF envelope waveform satisfies the specification 17. (Fig. 1)
If satisfied, perform the step (8) and later.
If not, perform the step (7) and later.

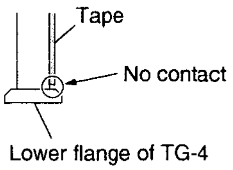
(7) Turn the zenith adjustment screw of the AT head so that the right portion of the RF envelope waveform makes 60 % or less of the maximum output level. (specification 17)
At this time, check that the tape does not in contact with both upper flange of TG-3 and lower flange of TG-4.
If the tape contacts either flange, repeat step (4) or (5).
If the tape moves upward or downward following the guide flange movement, perform the following adjustment.
This trouble cause is uneven tape tension at upside or downside of the tape caused by AT head zenith.

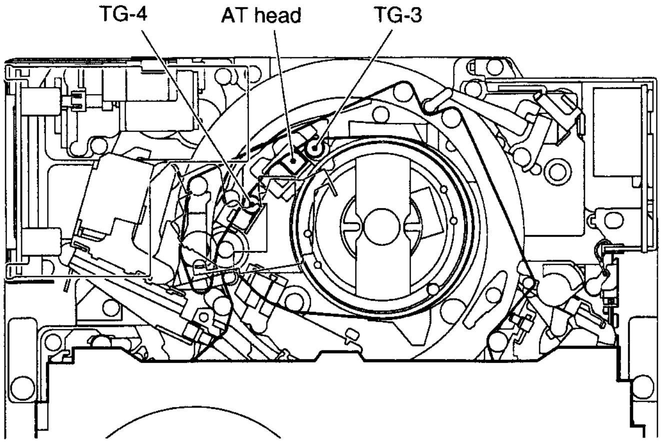
- If the tape moves upward at TG-3:
  Turn the zenith adjustment screw counterclockwise.
- If the tape moves downward at TG-4:
  Turn the zenith adjustment screw clockwise.

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300 (Tracking VR)
S101
1
2

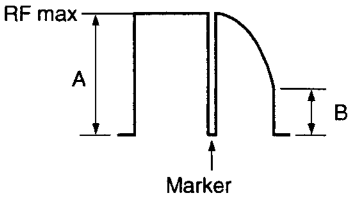

Upper flange of TG-3
No contact
Tape
Lower flange of TG-3


Tape
No contact
Lower flange of TG-4

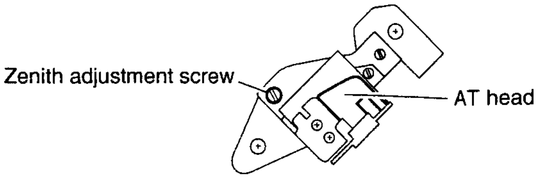

TG-4
AT head
TG-3

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>


RF max
A
B
Marker

Spec.17 : $\frac{B}{A} \times 100 = 30 \pm 30$ %


Zenith adjustment screw
AT head

(8) Turn the height adjustment nut of TG-3 clockwise so that the tape is in contact with the upper flange and the RF envelope waveform becomes flat. (Fig. 2)
Simultaneously, ensure that the tape does not in contact with the lower flange of TG-4.

If the waveform does not become flat, perform the steps ① to ③ (check and adjustment) below:

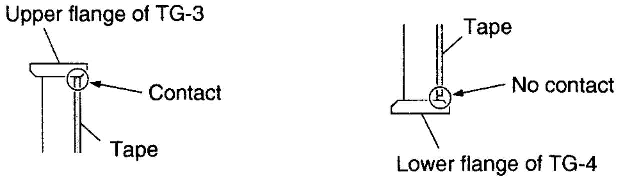
① Clean the drum lead with a wooden stick. (Refer to Section 4-2-4.)

② Press down the tape by wooden stick very lightly and check to see that the tape is running without aparting from the drum lead.

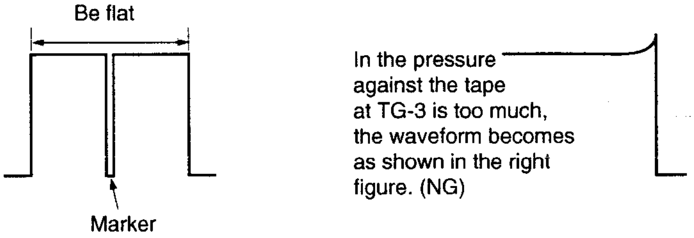
③ If the waveform does not become flat even after performing steps ① and ②, adjust the height of TG-3 so that the RF envelope waveform is nearly flat within the range of the specification 18 shown in the Fig.3. At this time, do not overpress the tape at TG-3.

Note

After adjusting the height of TG-3 in step ③ above, be sure to check the height of AT head (Refer to Section 6-3-6). If the AT head height does not satisfy the specification, repeat the video tracking adjustment.

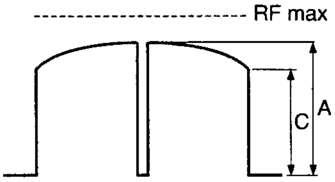


<Fig.2>



In the pressure against the tape at TG-3 is too much, the waveform becomes as shown in the right figure. (NG)

<Fig.3>



A = RF max × 0.8

Spec.18 : $\frac{C}{A} \times 100 \geqq 70$ %

(9) Adjust the height of TG-4 so that the lower flange of TG-4 in contact with the tape.

(10)Check the tape-running at the tape exit side in the following modes:

- PLAY mode
- F. FWD mode
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the tape curl at TG-3 does not satisfy the specification 19, perform the steps ① and ② (adjustment) below.

① Change the zenith of the AT head within the range of the specification 17.
(Refer to previous step (7).)

② Perform the tracking adjustment again.
(Refer to previous steps (2) through (10).)

(11)If the AT head zenith was changed in above ①, perform the checks and adjustments described below:

- AT head height (Refer to Section 6-3-6.)
- AT head azimuth (Refer to Section 6-3-7.)
- AT head head-to-tape contact (Refer to Section 6-3-8.)
- AT head position (Refer to Section 6-3-9.)

3. Attach the CL Guide Rail

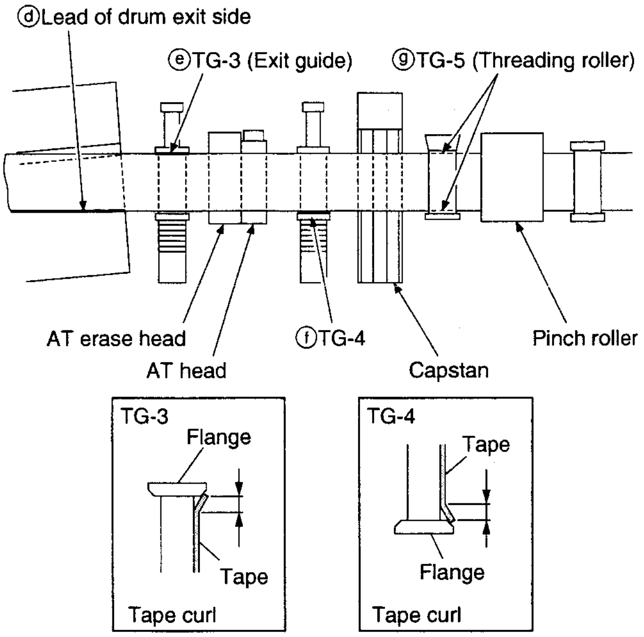
Turn off the power, then attach the CL guide rail.

4. Recheck the Video Tracking

Perform the steps 4 through 11 in Section 6-3-1 again.

Note

After adjustment, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).



Spec.19 : ⓓ Lead of drum exit side
The tape runs without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5 (Threading roller)
The tape runs without any curl at the upper and lower flanges.

Tracking Adjustment at the Tape Exit Side

6-3-4. CTL Head Height Check and Adjustment

Tools

- Alignment tape MR2-1P: 8-960-077-61
- Oscilloscope (Tektronix TDS460A or equivalent)
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

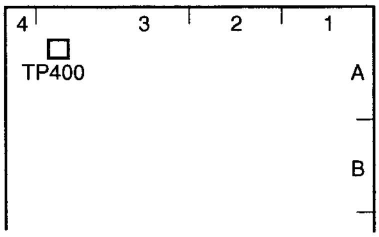
Connect the oscilloscope as follows:

CH-1: TP400/TC-104 board (CTL PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
TIME: 5 ms/DIV

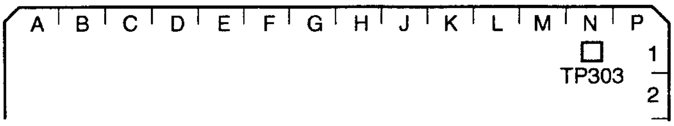
- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>



<SS-89 board, side A>



Preparation

Check

3. Check the CTL Head Height

Note

Never rotate the screw of portion C shown in the figure, or that might cause malfunctioning of tape running and head performance.

(1) Play back the alignment tape MR2-1P (15:00 to 25:00) in the PLAY mode.

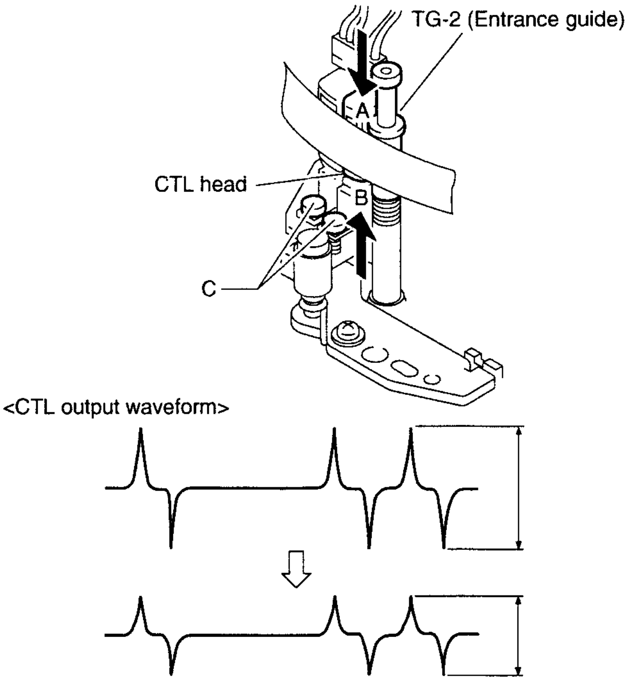
(2) Press down the portion A of the tape shown in figure, and then check to see that the level decreases by pressing the tape.

If the level increases, perform step 4-Ⓐ.

(3) Push up the portion B of the tape, and then check to see that the level decreases by pushing the tape.

If the level increases, perform step 4-Ⓑ.

- Alignment tape : MR2-1P (15:00 to 25:00)



Spec. : The level decreases when pressing down and when pushing up the alignment tape.

CTL Head Height Check

Adjustment

4. CTL Head Height Adjustment

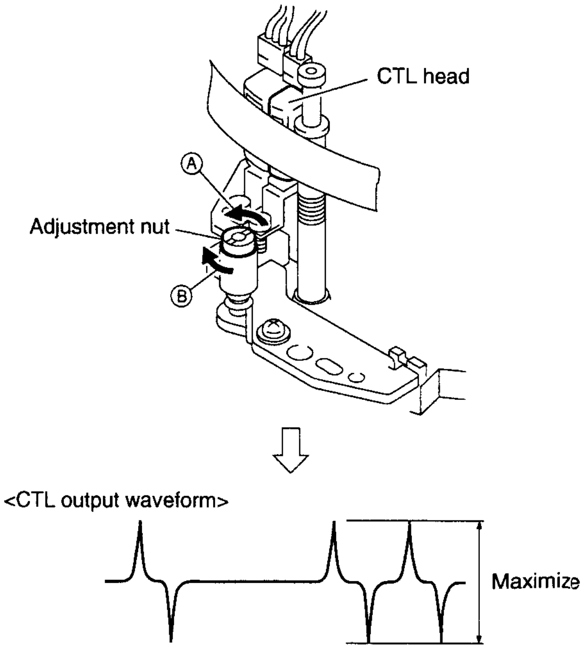
Ⓐ When the Level Increased by Pressing Down the Tape

Turn the adjustment nut counterclockwise (in the arrow Ⓐ direction) so that the output waveform is maximum.

Ⓑ When the Level Increases by Pushing Up the Tape

Turn the adjustment nut clockwise (in the arrow Ⓑ direction) so that the output waveform is maximum.

- Alignment tape : MR2-1P (15:00 to 25:00)



CTL Head Height Adjustment

6-3-5. CTL Head Position Check and Adjustment

Precaution

The CTL head position adjustment is closely related to the AT head position adjustment.
Be sure to confirm the AT head position after adjusting the CTL head position.

Tools

• Alignment tape MR2-1P:	8-960-077-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape MR2-1P and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

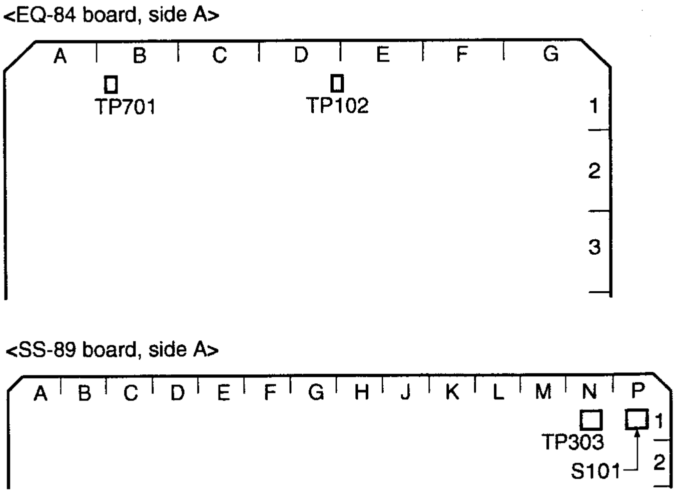
CH-1:	TP701/EQ-84 board (CNF AC ENV signal)
CH-2:	TP102/EQ-84 board (CNF AC SEL signal)
TRIG:	TP303/SS-89 board (CF4 signal)

Oscilloscope setting:

CH-1:	500 mV to 1 V/DIV
TRIG:	5 V/DIV
TIME:	2 ms/DIV

- Connection of the oscilloscope

CH-1 : TP701/EQ-84 board (CNF AC ENV signal)
CH-2 : TP102/EQ-84 board (CNF AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)



Preparation

Check

3. Check the CTL Head Position

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker shown in the figure is appeared following the positive slope of the CF4 signal. (Specification 1)

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(4) Rotate the tracking VR (RV300/SS-89 board) until the output level at the center of the RF envelope with the marker confirmed in step (2) becomes maximum, and read the level (Lv) at that time.

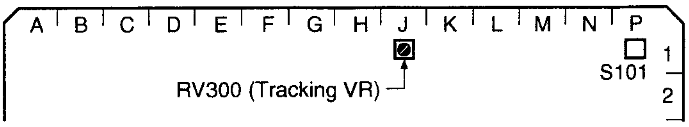
(5) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(6) Read the output level (LF) at the center of the RF envelope waveform.

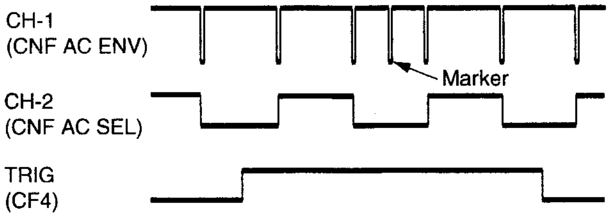
(7) Check that the level (Lv) read at step (4) and the level (LF) read at step (6) satisfy specification 2.

If they are without the specification, perform following step 4 and later.

<SS-89 board, side A>



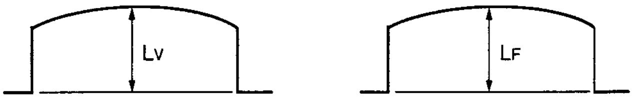
- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.1 : Marker RF envelope waveform should appear after the positive slope of CF4 signal.

S101-1/SS-89 board : ON
(Tracking control : Enabled)

S101-1/SS-89 board : OFF
(Tracking control : Disabled)



LF = Lv

Spec.2 : When the tracking VR is disabled, the output level at the center portion of the RF envelope waveform (LF) does not change from the maximum output level (Lv) under the state of the tracking control is enabled.

CTL Head Position Check

Adjustment

Note

Ensure that the tracking control is disabled (S101-1/SS-89 board ⇨ OFF) before following adjustment.

4. Adjust the CTL Head Position

(1) Loosen the securing screw of the CTL head assembly by 1/4 to 1/2 turn.

(2) Insert a 3 mm flatbladed screwdriver into the notch of the CTL head assembly.

(3) Adjust the CTL head assembly position so that the output level at the center portion is maximum and the marker appears in the RF envelope waveform following the positive slope of the CF4 signal. (Specification 3)

(4) Tighten the screw loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf • cm}

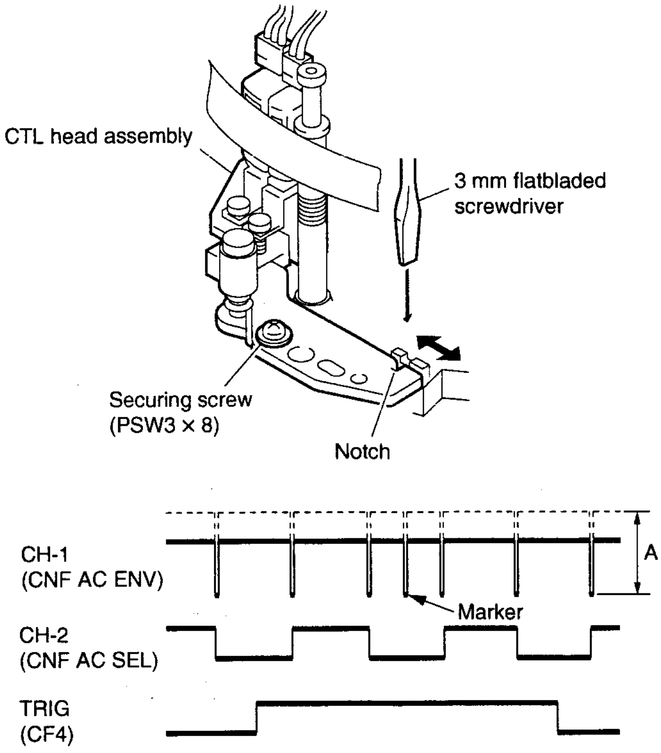
5. Recheck the CTL Head Position

Perform step 3 again.

Note

After adjustment, be sure to reset Bit-1 of the Dip switch S101 on the SS-89 board to OFF (pushed down).

- Alignment tape : MR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.3 : Make the portion A to the maximum level.

CTL Head Position Adjustment

After the Adjustment

6. Adjust Drum Phase

Refer to Section 7-2-3.

7. Adjust Digital DT System

Refer to Section 7-2-5.

8. Adjust Analog DT System

Refer to Section 7-2-8.

9. Adjust the AT Head Position

Refer to Section 6-3-9.

6-3-6. AT Head Height Check and Adjustment

Precaution

The AT head height adjustment is closely related to the azimuth adjustment, head-to-tape contact adjustment, and head position adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head height.

Tools

- Alignment tape

CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.
(3) Turn on the power.

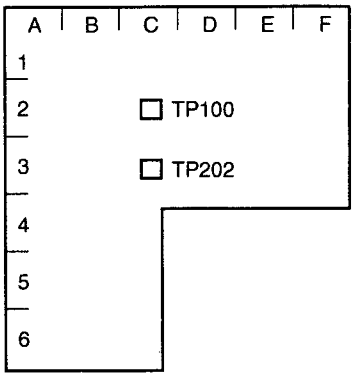
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Height

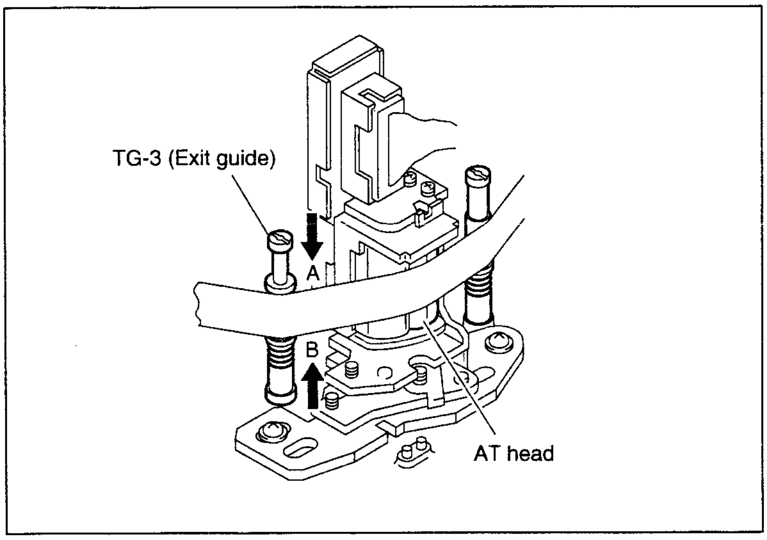
(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly press down the portion A of the tape shown in the figure, and check to see that both levels in CH-1 and CH-2 decrease by pressing the tape.

If both levels increase, perform step 4-Ⓐ.

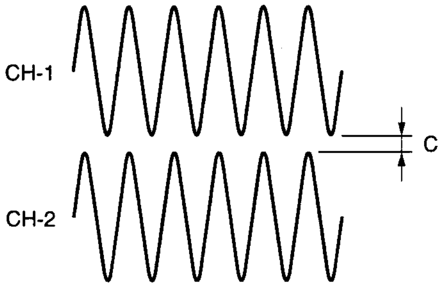
(3) Slightly push up the portion B of the tape, and check to see that both levels in CH-1 and CH-2 decrease by pushing the tape.

If both levels increase, perform step 4-Ⓑ of next page.



AT Head Height Check

• Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec. : The portion C widens when pressing down and when pushing up the alignment tape.

Specification

Adjustment

4. AT Head Height Adjustment

Ⓐ When both Levels Increase by Pressing Down the Tape

Turn the height adjustment screw clockwise so that both output level are maximum. (Fig. 1)
(Make the portion C minimize.)

Ⓑ When both Levels Increase by Pushing Up the Tape

(1) Turn the height adjustment screw counterclockwise to maximize both output levels from in CH-1 and CH-2. Turn the height adjustment screw counterclockwise furthermore to decrease the output level slightly. (Arrow ① in Fig. 2)

(2) Turn the height adjustment screw clockwise and adjust so that both output levels are maximum. (Arrow ② in Fig. 2)
(Make the portion C minimize.)

Note

To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved upward (with the height adjustment screw turned clockwise).

After the Adjustment

5. Adjust the AT Head Azimuth

Refer to Section 6-3-7.

6. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-3-8.

7. Adjust the AT Head Position

Refer to Section 6-3-9.

8. Recheck the AT Head Height

Refer to step 3 in this section.

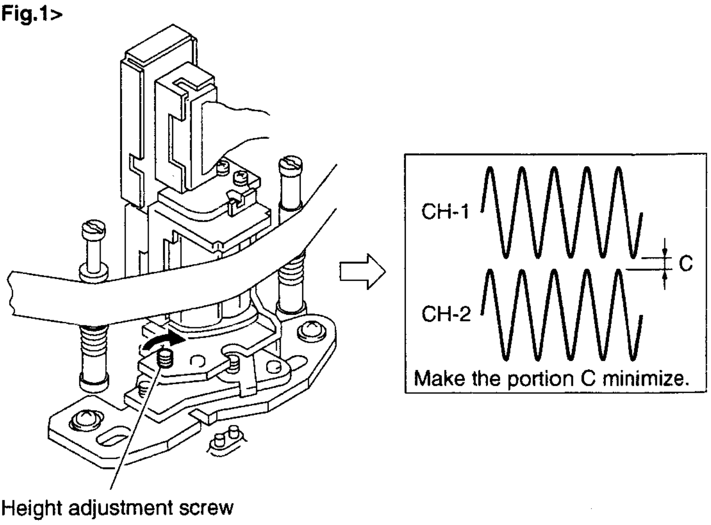
9. Recheck the AT Head

Perform the steps 5 through 7 again.

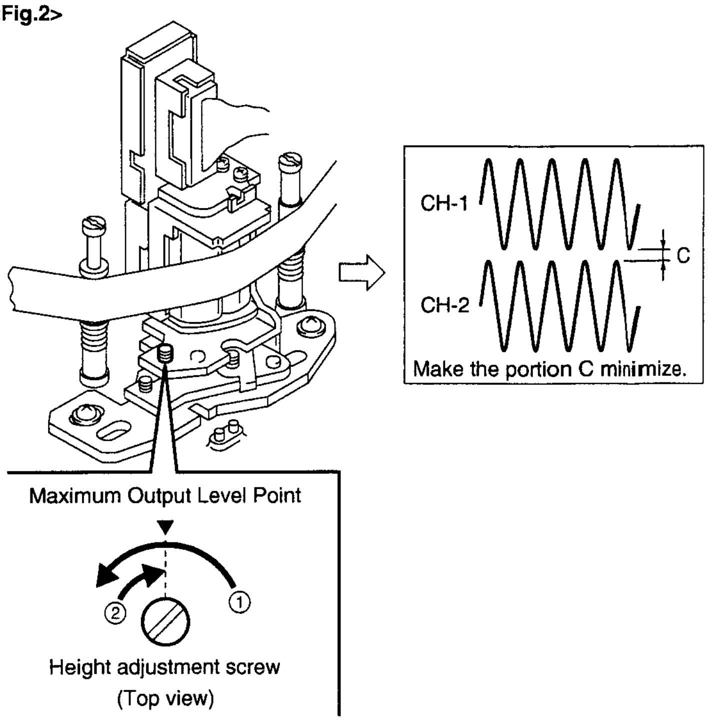
10. Apply the Locking Compound

Refer to Section 6-1-9.

<Fig.1>


CH-1
C
CH-2
Make the portion C minimize.
Height adjustment screw

<Fig.2>


CH-1
C
CH-2
Make the portion C minimize.
Maximum Output Level Point
②
①
Height adjustment screw
(Top view)

AT Head Height Adjustment

6-3-7. AT Head Azimuth Check and Adjustment

Precaution

The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.

Tools

- Alignment tape

CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

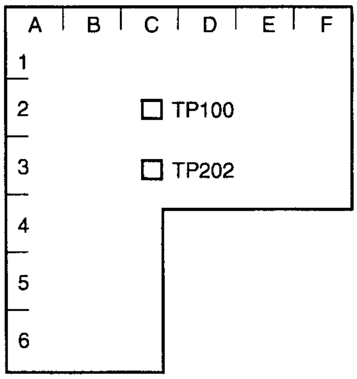
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 100 mV/DIV
CH-2: 100 mV/DIV
MODE: X-Y

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

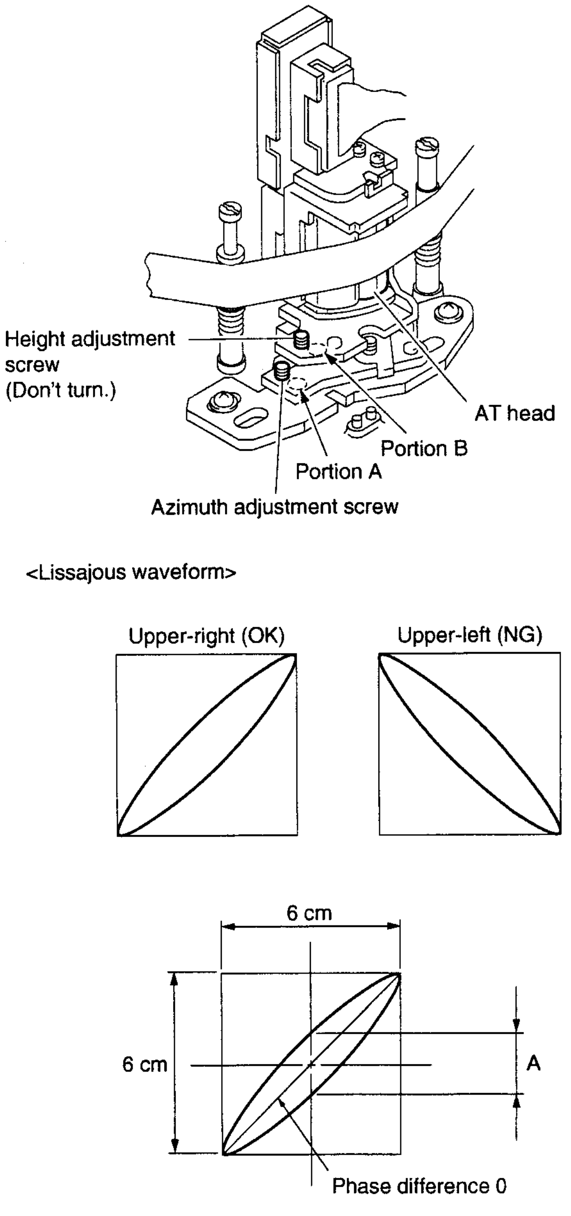
3. Check the AT Head Azimuth

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.
(2) Adjust the horizontal and vertical amplitudes of lissajous waveform displayed on the oscilloscope to six cm each.
(3) Check that the lissajous waveform holds the upper-right shape.
(4) Check that the vertical amplitude at the center point in the horizontal direction satisfies the specification.

If the specification in figure is not satisfied, perform following steps 4 and later.

(5) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

• Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : $A \leqq 0.52$ cm

AT Head Azimuth Adjustment

Adjustment

4. Adjust the AT Head Azimuth

(1) Turn the azimuth adjustment screw so that the specification is satisfied.
(2) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

After the Adjustment

5. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-3-8.

6. Adjust the AT Head Position

Refer to Section 6-3-9.

7. Check the AT Head Height

Refer to Section 6-3-6.

8. Check the AT Head Azimuth

Refer to step 3 in this section.

9. Recheck the AT head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-3-8. AT Head Head-to-tape Contact Check and Adjustment

Precaution

The AT head head-to-tape contact adjustment is closely related to the head position adjustment, head height adjustment, and head azimuth adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head head-to-tape contact.

Tools

• Alignment tape	
CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

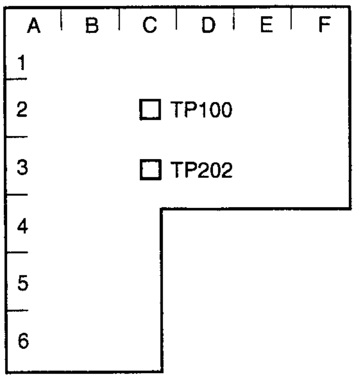
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

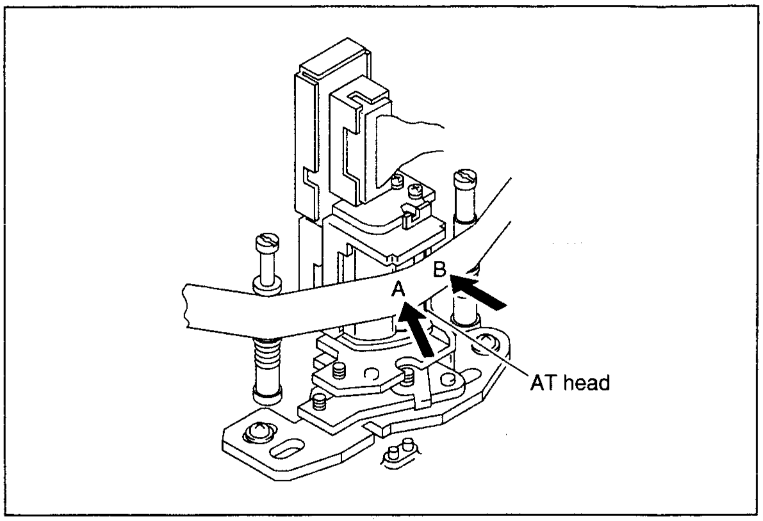
3. Check the AT Head Head-to-tape Contact

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

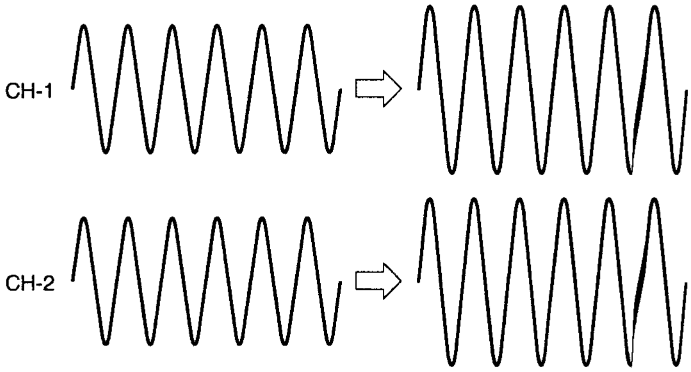
(3) Check that both increased amount of the output levels in CH-1 and CH-2 satisfy the specification.

If the specification is not satisfied, perform following steps 4 and later.



AT Head Head-to-tape Contact Check

• Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : Both increased amount of the output levels in CH-1 and CH-2 are within 5 %.

Specification

Adjustment

4. Adjust the AT Head Head-to-tape Contact

(1) Loosen the two head securing screws by 1/4 to 1/2 turn.
(2) Insert a 2 mm flatbladed screwdriver into the notch of the adjustment plate.
(3) Adjust the AT head position to maximize the output level.
(4) Tighten the two securing screws loosened in step (1).

Tightening torque: 19.6×10^{-2} N•m
{2 kgf•cm}

5. Recheck the AT Head Head-to-tape Contact

Perform to previous step 3 in this section again.

After the adjustment

6. Check the AT Head Position

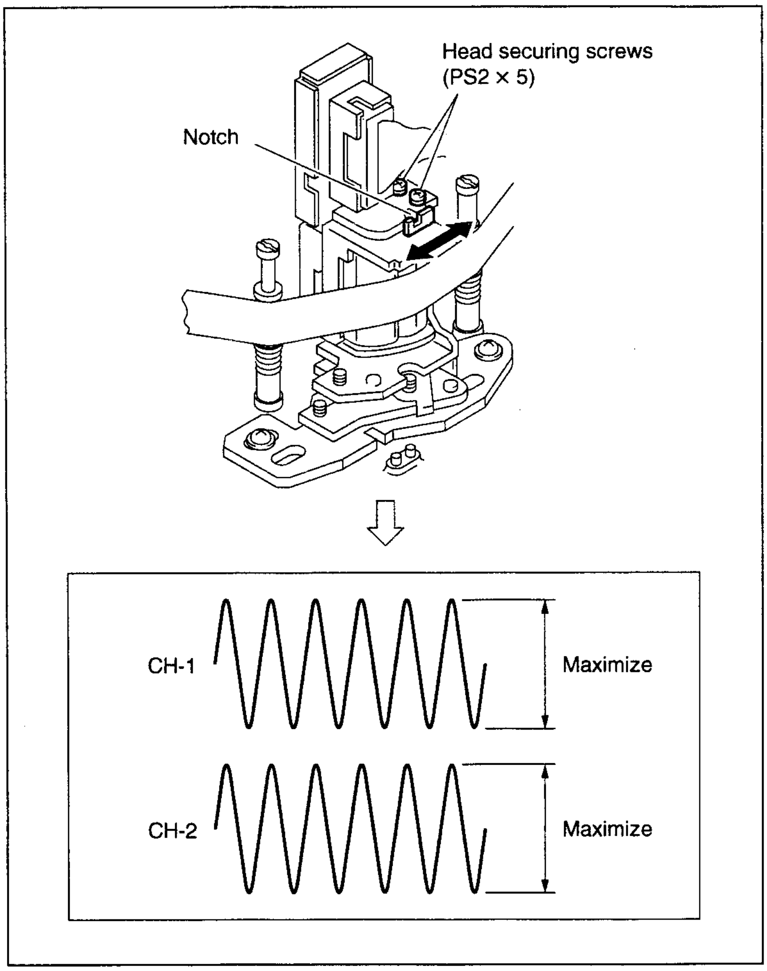
Refer to Section 6-3-9.

7. Check the AT Head Height

Refer to Section 6-3-6.

8. Check the AT Head Azimuth

Refer to Section 6-3-7.



AT Head Head-to-tape Contact Adjustment

6-3-9. AT Head Position Check and Adjustment

Precautions

- The CTL head position adjustment should be completed before performing this adjustment. The AT head position is adjusted relative to the CTL head position as reference.
- The AT head position adjustment is closely related to the head height adjustment, head azimuth adjustment, and head-to-tape contact adjustment. Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head position.

Tools

• Alignment tape MR2-1P:	8-960-077-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape MR2-1P, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

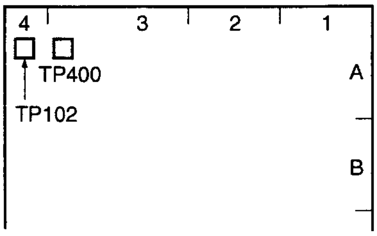
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
CH-2: TP102/TC104 board (TC PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
CH-2: 2 V/DIV
TIME: 10 ms to 500 µs/DIV

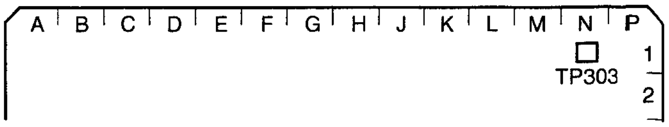
- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>



<SS-89 board, side A>



Preparation

Check

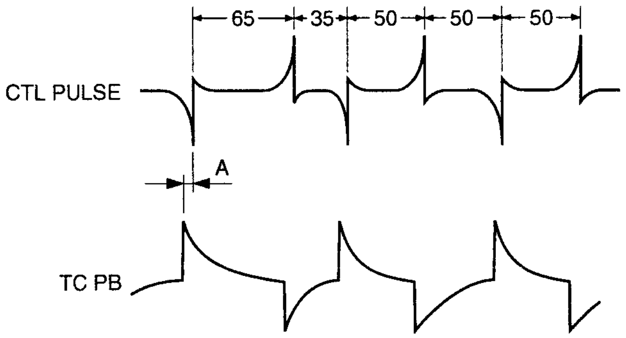
3. Check the AT Head Position

(1) Play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the positional relationship between the rising edges of CTL's 65:35 pulse and TC PB's 65:35 waveform signals satisfies the specification.

If the specification is not satisfied, perform following steps 4 and later.

- Alignment tape : MR2-1P (00:00 to 15:00)



Spec. (for check) : A = 0 ±4.1 ms

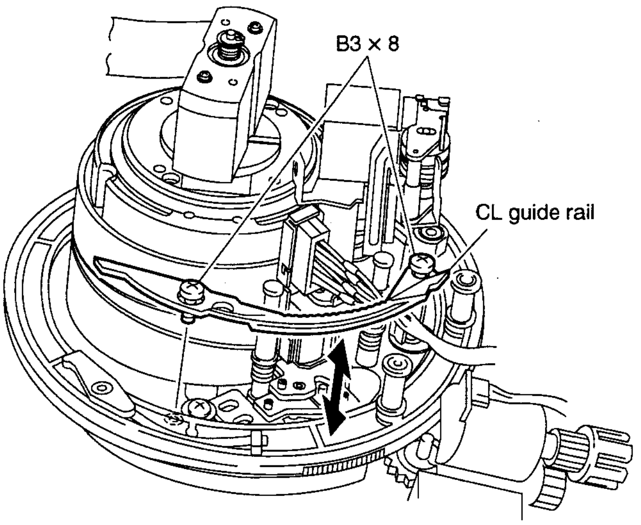
AT Head Position Check

Adjustment

4. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws, then remove the CL guide rail.



CL Guide Rail Removal/Reattachment

5. Adjust the AT Head Position

(1) Loosen the two securing screws of the AT head assembly by 1/4 to 1/2 turn.

(2) Turn on the power, then play back the alignment tape MR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Insert a 3 mm flatbladed screwdriver into the notch of the AT head assembly.

(4) Adjust the AT head assembly position so that the specification is satisfied.

Note

The specifications in AT head position check and position adjustment differ. When adjusting, apply the specification in AT head position adjustment.

(5) Tighten the two screws loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf•cm}

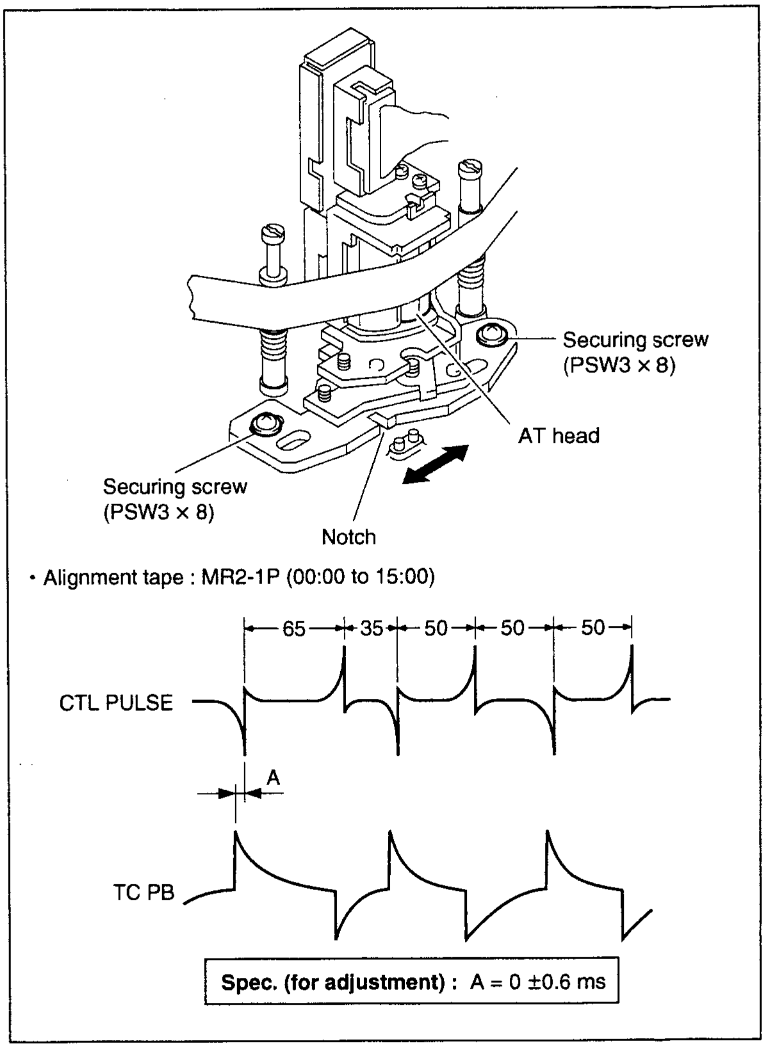
6. Recheck the AT Head Position

Perform previous step 3 in this section again.

7. Attach the CL Guide Rail

(1) Turn off the power, then remove the alignment tape.

(2) Attach the CL guide rail with two screws.



• Alignment tape : MR2-1P (00:00 to 15:00)

Spec. (for adjustment) : A = 0 ±0.6 ms

AT Head Position Adjustment

After the Adjustment

8. Check the AT Head Height

Refer to Section 6-3-6.

9. Check the AT Head Azimuth

Refer to Section 6-3-7.

10. Check the AT Head Head-to-tape Contact

Refer to Section 6-3-8.

11. Check the AT Head Position

Refer to step 3 in this section.

12. Apply the Locking Compound

Refer to Section 6-1-9.

6-3-10. Audio Level Check and Adjustment in REV Mode

Tools

- Alignment tape

CR8-1A (for 525):	8-960-097-45
CR8-1A PS (for 625):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

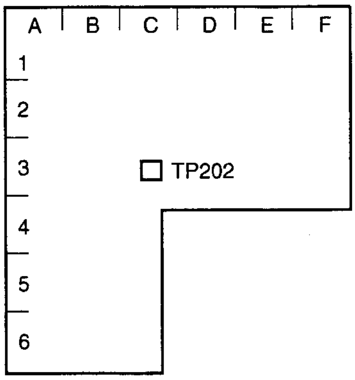
(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP202/AE-31 board (CH-2 PB signal)
<AE-31 board, side A>



Preparation

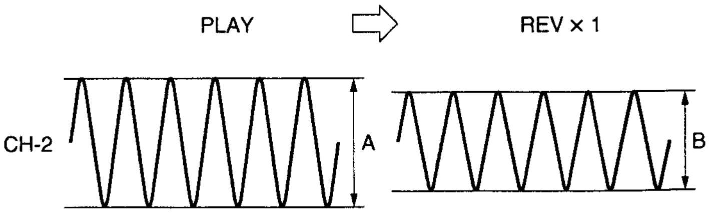
Check

3. Check the Audio Output Level

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS.
(2) Check the audio output level A in CH-2.
(3) Set the REV × 1 mode.
(4) Check that the audio output level B in CH-2 satisfies specification 1.

If specification 1 is not satisfied, perform following steps 4 and later.

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec.1 : $\frac{B}{A} \times 100 \geqq 90$ %

Audio Level Check in REV Mode

Adjustment

4. Adjust the TG-5 (Threading Roller) Height

(1) Play back the 1 kHz, 0 VU signal portion on the alignment tape CR8-1A/CR8-1A PS (8:00 to 10:00).

(2) Set the REV × 1 mode.

(3) Slightly press down the portion A of the tape shown in figure, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 clockwise using a tape guide adjustment driver.

(4) Slightly push up the portion B of the tape, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 counterclockwise using the tape guide adjustment driver.

(5) Check the output level satisfies specification 1 (previous page).

If the specification 1 is not satisfied, repeat steps (1) through (4) mentioned above.

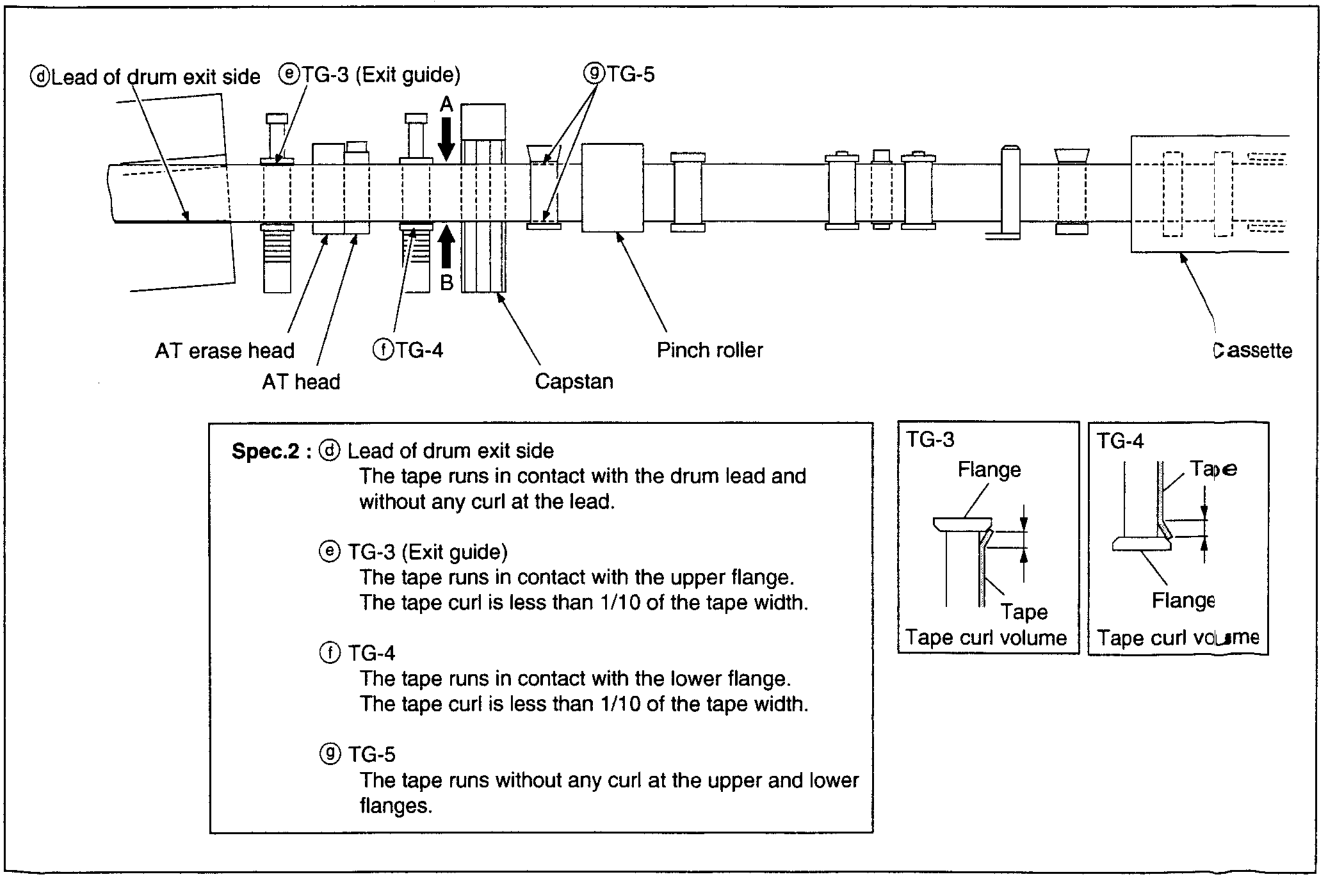
5. Check the Tape-running at Tape Exit Side

In the following modes, check that the tape-running condition satisfies specification 2.

- PLAY mode
- REV × 1 mode

If specification 2 is not satisfied, adjust the tape guides height at the tape exit side. (Refer to step 7 (at the Tape Exit Side) in Section 6-7-2.)

If the height of the tape guide is adjusted, perform the video tracking check.
(Refer to Section 6-3-1.)



Spec.2 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5
The tape runs without any curl at the upper and lower flanges.

Audio Level Adjustment in REV Mode

6-4. HDW Recorder Tape Path

Applicable models: HDW-2000, D2000, M2000/M2000P, S2000/S2000P

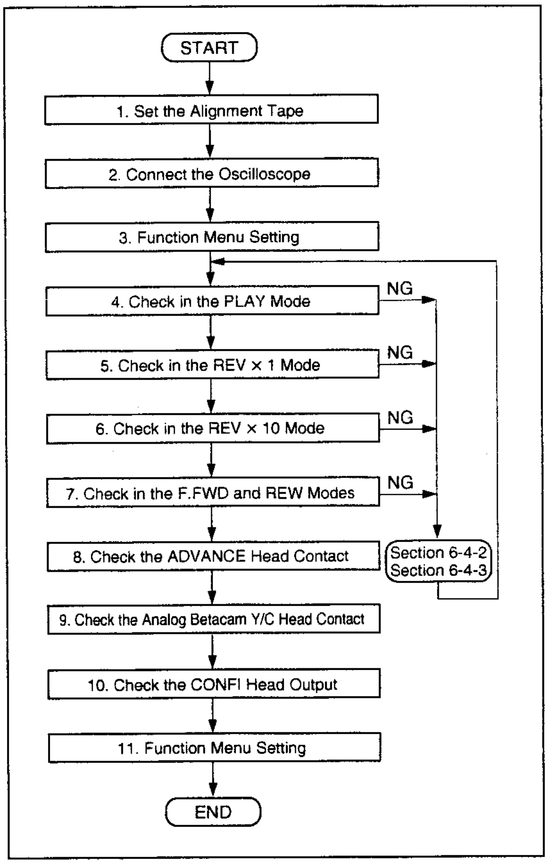
6-4-1. Video Tracking Check

Tools

• Alignment tapes	
HR2-1A:	8-960-076-11
HR5-1A:	8-960-076-01
CR2-1B (for HDW-M2000/S2000):	8-960-096-01
CR2-1B PS (for HDW-M2000P/S2000P):	8-960-096-51
• Recording tape (S cassette):	BCT-40HD
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Small dental mirror:	J-6080-029-A
• Tape guide adjustment screwdriver (MW-261):	J-6322-610-A

Note

When checking video tracking, the RF envelope waveform (PLAY mode) should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments only when without the specifications.


START
1. Set the Alignment Tape
2. Connect the Oscilloscope
3. Function Menu Setting
4. Check in the PLAY Mode
NG
5. Check in the REV x 1 Mode
NG
6. Check in the REV x 10 Mode
NG
7. Check in the F.FWD and REW Modes
NG
8. Check the ADVANCE Head Contact
Section 6-4-2
Section 6-4-3
9. Check the Analog Betacam Y/C Head Contact
10. Check the CONFI Head Output
11. Function Menu Setting
END

Video Tracking Check/Adjustment Flow Chart

Setting

1. Set the Alignment Tape

(1) Press the switch S300 on the SS-89 board during power-on to set the reel tables to the S cassette position.

(2) Turn off the power.

(3) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.

2. Connect the Oscilloscope

- Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board (REC AC ENV signal)
CH-2: TP104/EQ-84 board (REC AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

- Oscilloscope setting:

CH-1: 500 mV to 1 V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

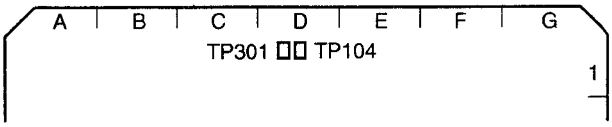
3. Function Menu Setting

Turn on the power, then set the F1 (CAPSTN) of function menu Page4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)

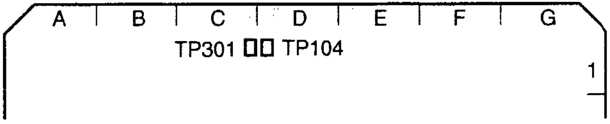
- Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)

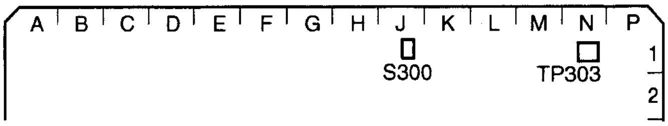
<EQ-84 board, side A>
Board No.suffix 12



Board No.suffix 13 and higher



<SS-89 board, side A>



Preparation

Check

4. Check in the PLAY Mode

(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker as shown in the figure appears following the positive slope of the CF4 signal.
Use this portion of the RF envelope waveform when checking video tracking in the PLAY mode.
If extremely abnormal waveform (Fig. 1) is output after replacing the upper drum assembly, remove and re-attach the upper drum assembly.

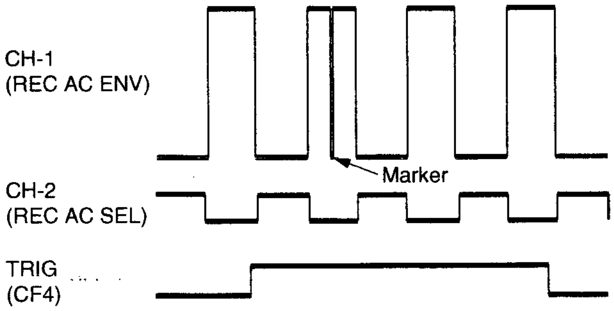
- Refference:
  Section 5-2. Upper Drum Assembly Replacement

Note

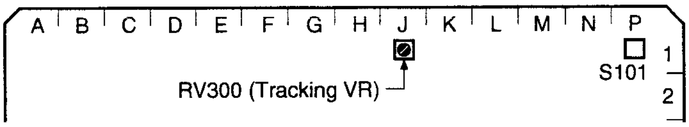
The RF envelope waveform is recorded on HR2-1A (00:00 to 15:00) only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

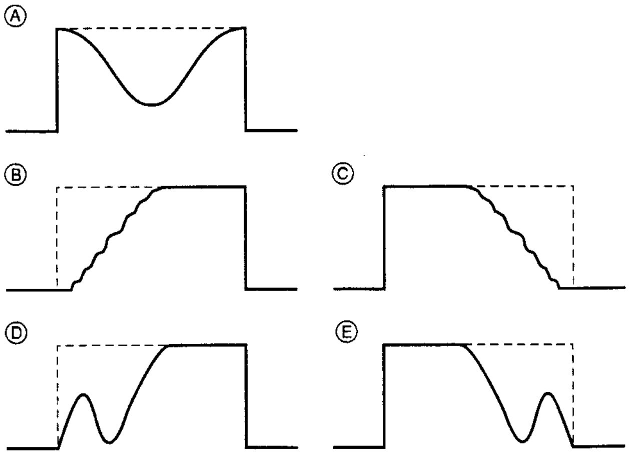
- Alignment tape : HR2-1A (00:00 to 15:00)



<SS-89 board, side A>



<Fig.1 : NG waveforms of AC ENV signal (Examples)>



(4) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(5) In the step (4) state, check to see that the RF envelope waveform satisfies specification 1.

Note

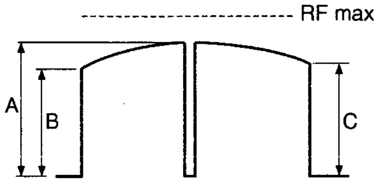
If the level fluctuates, read the average value.

(6) If the level fluctuates, rotate the tracking VR (RV300/SS-89 board) clockwise to maximize the output level at the center of the RF envelope waveform, and check that the fluctuation amount satisfies specification 2.

If specifications 1 and 2 are not satisfied, perform the adjustment in the Section 6-4-2 (Tape Entrance Side) or Section 6-4-3 (Tape Exit Side).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Head-to-tape contact>

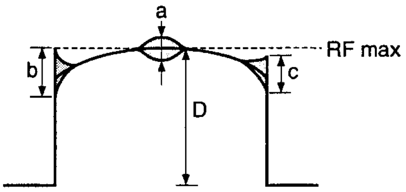


A = RF max × 0.8

Spec.1 : Output levels (B and C) at the tape entrance side and exit side are more than 70 % of the center level (A).

$\frac{B}{A} \times 100 \geqq 70\,\%$ $\frac{C}{A} \times 100 \geqq 70\,\%$

<Fluctuation>



D = Average maximum level at waveform center

Spec.2 : Fluctuation amounts (a, b, c) at the drum center portion, entrance side and exit side are less than 20 % of the average maximum level (D).

$\frac{a}{D} \times 100 \leqq 20\,\%$ $\frac{b}{D} \times 100 \leqq 20\,\%$ $\frac{c}{D} \times 100 \leqq 20\,\%$

Video Tracking Check (PLAY)

5. Check in the REV × 1 Mode

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(2) Play back the alignment tape HR2-1A (00:00 to 15:00).

(3) Set the REV × 1 mode, and check that the RF envelope waveform satisfies specification 3.

If the waveform at the entrance is without the specification 3, adjust tracking at the drum entrance. (Refer to Section 6-4-2.)
If the waveform at the exit is NG, adjust the height of TG-5 before tracking adjustment.

Note

Adjusting the height of TG-5
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

If the specification is still not satisfied, adjust tracking at the drum exit. (Refer to Section 6-4-3.)

(4) Also check that the tape is running with maintaining the state of the specification 4.

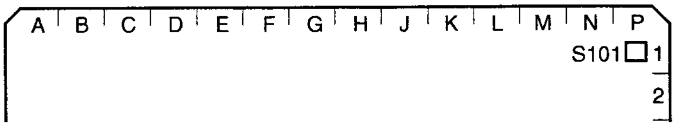
If specification 4 is not satisfied, first adjust the height of TG-5.

Note

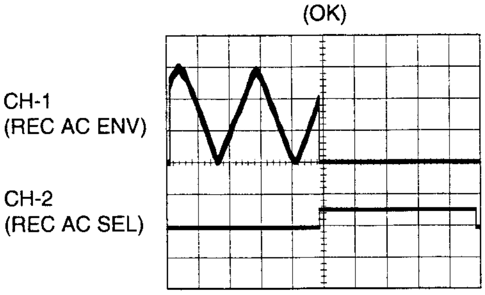
Adjusting the height of TG-5:
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

When the specification 4 is not still satisfied even after adjusting the height of TG-5, adjust the tracking at tape exit. (Refer to Section 6-4-3.)

<SS-89 board, side A>

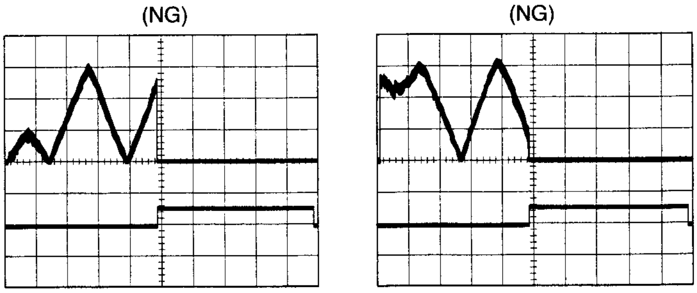


- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

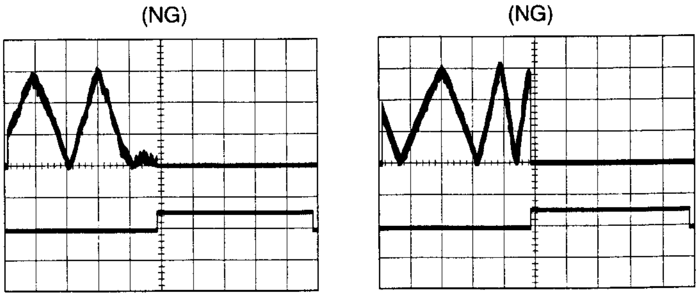


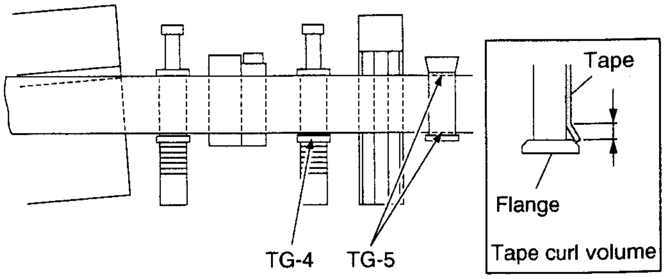
Spec.3 : Appears waveforms with no lacking.
Uniform waveforms without variation.

- In the case of the drum entrance side is NG (Example) :



- In the case of the drum exit side is NG (Example) :





Spec.4 : Lower flange of TG-4
The tape curl is less than 1/10 of the tape width.

Video Tracking Check (REV × 1)

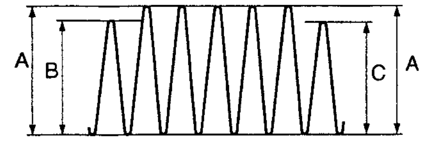
6. Check in the REV × 10 Mode

(1) Play back the alignment tape HR2-1A (00:00 to 15:00).

(2) Set the REV × 10 mode, and check that the RF envelope waveform satisfies specification 5.

If specification 5 is not satisfied, perform the adjustment in the Section 6-4-2 (Tape Entrance Side) or Section 6-4-3 (Tape Exit Side).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.5 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)

Video Tracking Check (REV × 10)

7. Check in the F.FWD and REW Modes

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board (ADV BD ENV signal)
TRIG: TP100/ EQ-84 board (ADV AC SEL signal)

(2) Play back the alignment tape HR2-1A (00:00 to 15:00).

(3) Set the F.FWD mode, and check that the RF waveform satisfies specification 6 and specification 7.

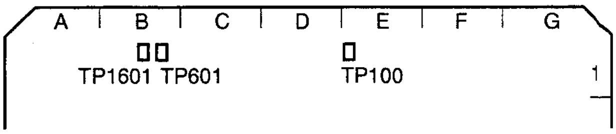
(4) Set the REW mode, and check that the RF waveform satisfies specification 6 and specification 7.

If specifications 6 and 7 are not satisfied, perform the adjustment in the Section 6-4-2 (Tape Entrance Side) or Section 6-4-3 (Tape Exit Side).

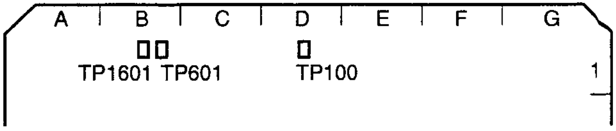
- Connection of the oscilloscope

  CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
  CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
  TRIG : TP100/EQ-84 board (ADV AC SEL signal)

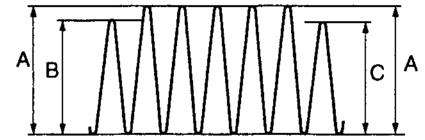
<EQ-84 board, side A >
Board No.suffix 12



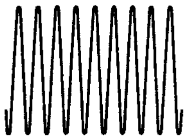
Board No.suffix 13 and higher



- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.6 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)



Spec.7 : Appears waveforms with no lacking.

Video Tracking Check (F.FWD, REW)

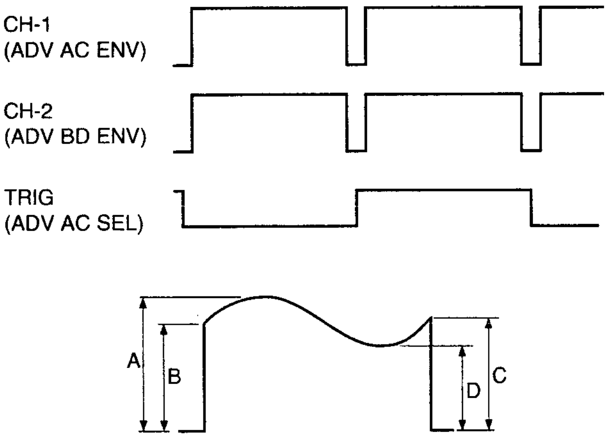
8. Check the ADVANCE Head Contact

(1) Play back the alignment tape HR5-1A in the PLAY mode.

(2) Check that the RF envelope waveforms of ADV AC ENV and ADV BD ENV satisfy specification 8.

(3) Turn off the power, then remove the alignment tape.

- Alignment tape : HR5-1A
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.8 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A}\times100 \geqq 70\ \%$ $\frac{C}{A}\times100 \geqq 70\ \%$ $\frac{D}{A}\times100 \geqq 70\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

ADVANCE Head Contact Check

9. Check the Analog Betacam Y/C Head Contact

Note

This step is not reqired for HDW-2000/D2000.

(1) Set the oscilloscope as follows:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(2) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(3) Set Bit-1, Bit-2 and Bit-3 of DIP switch S101 on the SS-89 board to ON (pushed up).

(4) Turn on the power, then play back CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

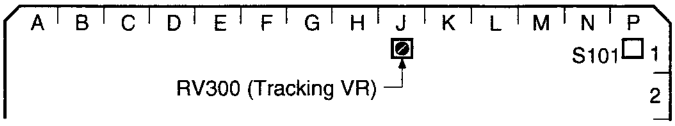
(5) Rotate the tracking VR (RV300/SS-89) to maximize the level at the center of the RF envelope waveform.

(6) Check that the RF envelope waveform is output in each channel.
Check that the Ya and Ca RF envelope waveforms satisfy specification 9.

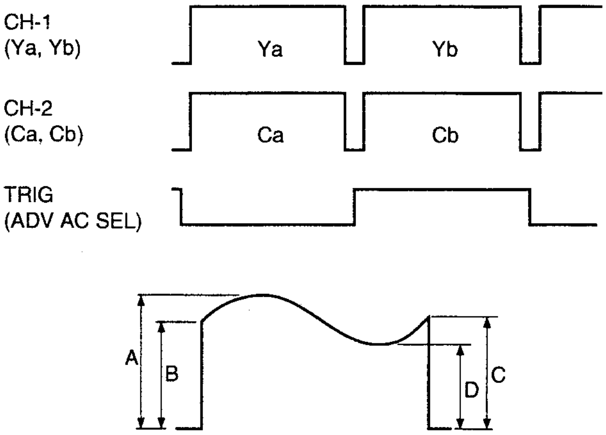
(7) Turn off the power, then remove CR2-1B/CR2-1B PS.

(8) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
  S101-1/SS-89 board : ON (Tracking VR : Enabled)



Spec.9 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A}\times 100 \geqq 75\ \%$ $\frac{C}{A}\times 100 \geqq 75\ \%$ $\frac{D}{A}\times 100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

Analog Betacam Y/C Head Contact Check

10. Check the CONFI Head Output

(1) Connect the oscilloscope as follows:
CH-1: TP701/EQ-84 board
(CNF AC ENV signal)
CH-2: TP1701/ EQ-84 board
(CNF BD ENV signal)
TRIG: TP102/ EQ-84 board
(CNF AC SEL signal)
Oscilloscope setting:
CH-1: 500 mV/DIV
CH-2: 500 mV/DIV
TRIG: 5 V/DIV
TIME: 5 ms

(2) Set the recording tape BCT-40HD and put a weight (about 1000 g) onto it.

(3) Turn on the power.

(4) While pressing the PLAY button, press the REC button to set the recording mode.

(5) Check that the RF waveform is output from CH1 and CH2 during recording as shown in the figure and that specification 10 is satisfied.

(6) Turn off the power, then remove the recording tape.

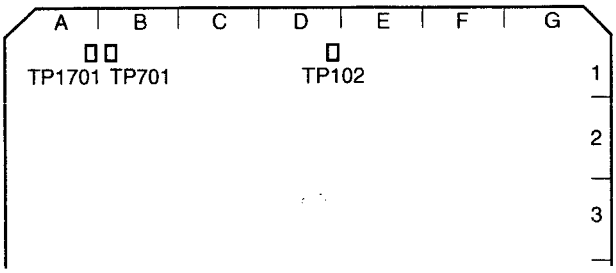
11. Function Menu Setting

Turn on the power, then return F1 (CAPSTN) of function menu Page 4 to the customer setting.

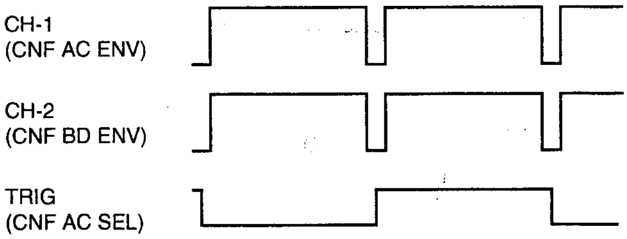
- Connection of the oscilloscope

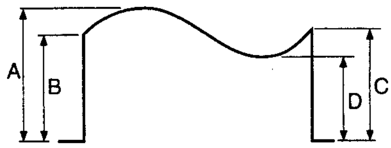
CH-1 : TP701/EQ-84 board (CNF AC ENV signal)
CH-2 : TP1701/EQ-84 board (CNF BD ENV signal)
TRIG : TP102/EQ-84 board (CNF AC SEL signal)

<EQ-84 board, side A>



<CONFI output waveform>





Spec.10 : The whole waveform should be 70 % output or more than the maximum level.
$\frac{B}{A} \times 100 \geqq 70\%$ $\frac{C}{A} \times 100 \geqq 70\%$ $\frac{D}{A} \times 100 \geqq 70\%$
B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

CONFI Head Output Check

6-4-2. Tracking Adjustment at the Tape Entrance Side

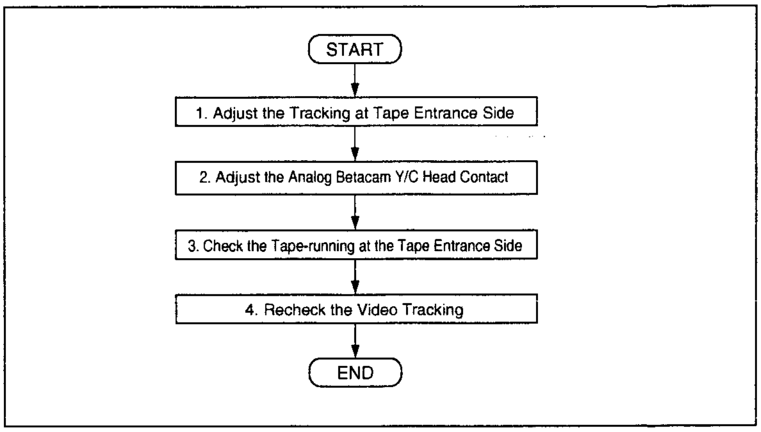
This adjustment should be performed when the specifications have not been satisfied in Section 6-4-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-4-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat to the entrance and exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the followings:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.


START
1. Adjust the Tracking at Tape Entrance Side
2. Adjust the Analog Betacam Y/C Head Contact
3. Check the Tape-running at the Tape Entrance Side
4. Recheck the Video Tracking
END

Flow Chart of Tracking Adjustment at the Tape Entrance Side

1. Adjust the Tracking at the Tape Entrance Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

(2) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level. (Fig. 1)

(4) Loosen the height adjustment nut of TG-2 so that the tape does not in contact the upper flange. (Fig. 2)

(5) Rotate the height adjustment nut of TG-1 to flatten the RF envelope waveform. (Fig. 1)

If the waveform does not become flat, perform the following adjustment (① to ③).

① Clean the lower drum lead with a wooden stick. (Refer to Section 4-2-4.)

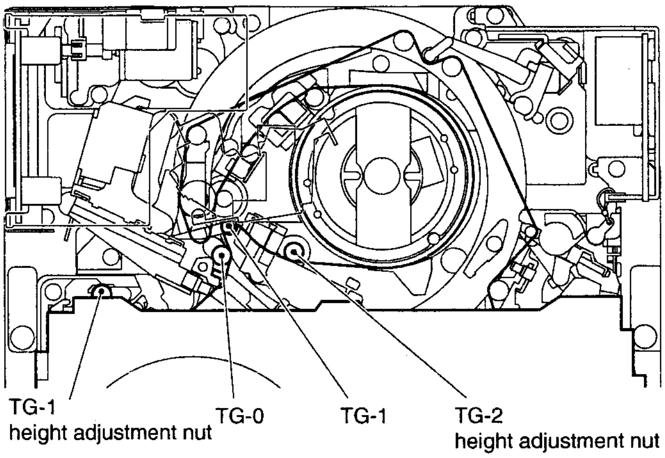
② While running the tape, press the tape lightly with the wooden stick and check that the tape does not float from the lead.

③ Adjust the height of TG-1 so that the RF envelope waveform becomes as flat as possible within the scope of Specification 11 in Fig. 3.

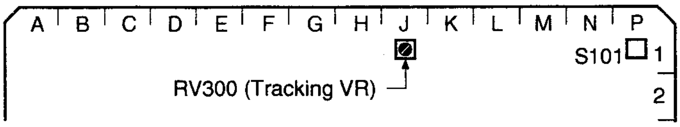
(6) Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 4)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

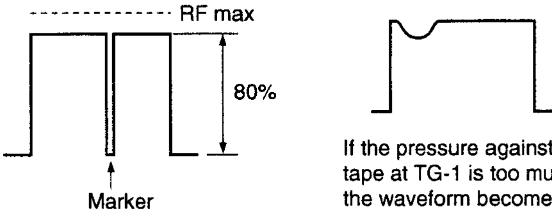

TG-1
height adjustment nut
TG-0
TG-1
TG-2
height adjustment nut

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
S101
1
2
RV300 (Tracking VR)

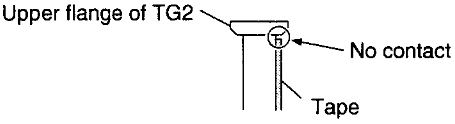
- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>

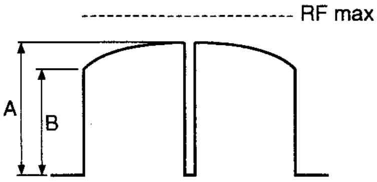

RF max
80%
Marker

If the pressure against the tape at TG-1 is too much, the waveform becomes as shown in the upper figure. (NG)

<Fig.2>


Upper flange of TG2
No contact
Tape

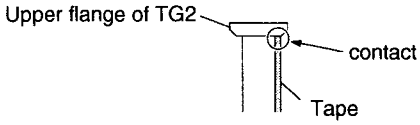
<Fig.3>



A = RF max × 0.8

Spec.11: $\frac{B}{A} \times 100 \geqq 70\ \%$

<Fig.4>


Upper flange of TG2
contact
Tape

Tracking Adjustment at Tape Entrance Side (PLAY)

2. Adjust the Analog Betacam Y/C Head Contact

Note

This step is not required for HDW-2000/D2000.

(1) Turn off the power, then remove the alignment tape.

(2) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)
Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(3) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(4) Set Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(5) Turn on the power, then playback the CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(6) Turn the tracking VR (RV300/SS-89 board) so that the center portion of the RF envelope waveform becomes the maximum output level.

(7) Check that the RF envelope waveform is output in each channel. Check that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 12.

If specification 12 is not satisfied, perform step (12) and later.

(8) Turn off the power, then remove the alignment tape CR2-1B/CR2-1B PS.

(9) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

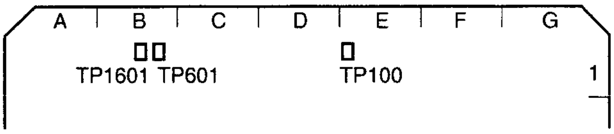
(10)Set the alignment tape HR2-1A and put the weight (approx. 1000 g) onto it.

(11)Turn on the power, then perform following step 3 and later.

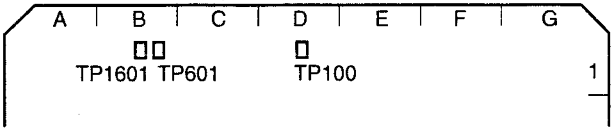
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

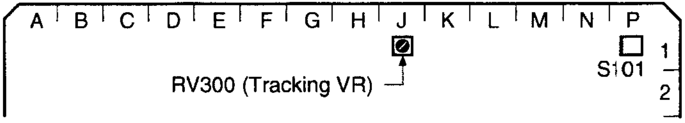
<EQ-84 board, side A>
Board No.suffix 12



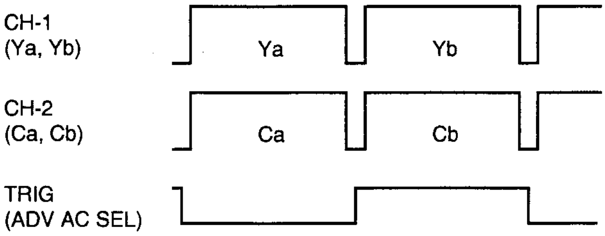
Board No.suffix 13 and higher

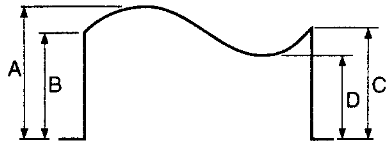


<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.12 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\ \%$ $\frac{C}{A} \times 100 \geqq 75\ \%$ $\frac{D}{A} \times 100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

(12)Loosen the height adjustment nut of TG-2 so that the tape does not touch the upper flange. (Fig. 5)

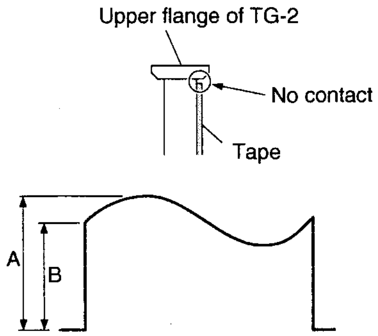
(13)Rotate the height adjustment nut of TG-1 and adjust so that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 13.

(14)Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 6)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

<Fig.5>

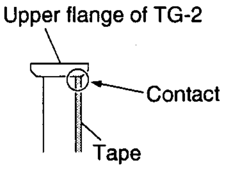


Spec.13 : The output of the entrance waveform must be 80 % of maximum value.

$\frac{B}{A}$ x 100 = 80 % (Not B/A x 100 > 80 %)

However if the outputs of the entrance waveform of the Ya RF envelope waveform and Ca RF envelope waveform are both not 80 % of the maximum value, adjust so that the RF envelope with the smaller entrance waveform output becomes 80 % of the maximum value.

<Fig.6>



Analog Betacam Y/C Head Contact Adjustment

(15)Turn off the power, then remove the CR2-1B/CR2-1B PS.

(16)Reset Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(17)Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board
(REC AC ENV signal)
CH-2: TP104/EQ-84 board
(REC AC SEL signal)
TRIG: TP303/SS-89 board
(CF4 signal)

(18)Change the oscilloscope setting as follows:

CH1: 500 mV to 1V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

(19)Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.

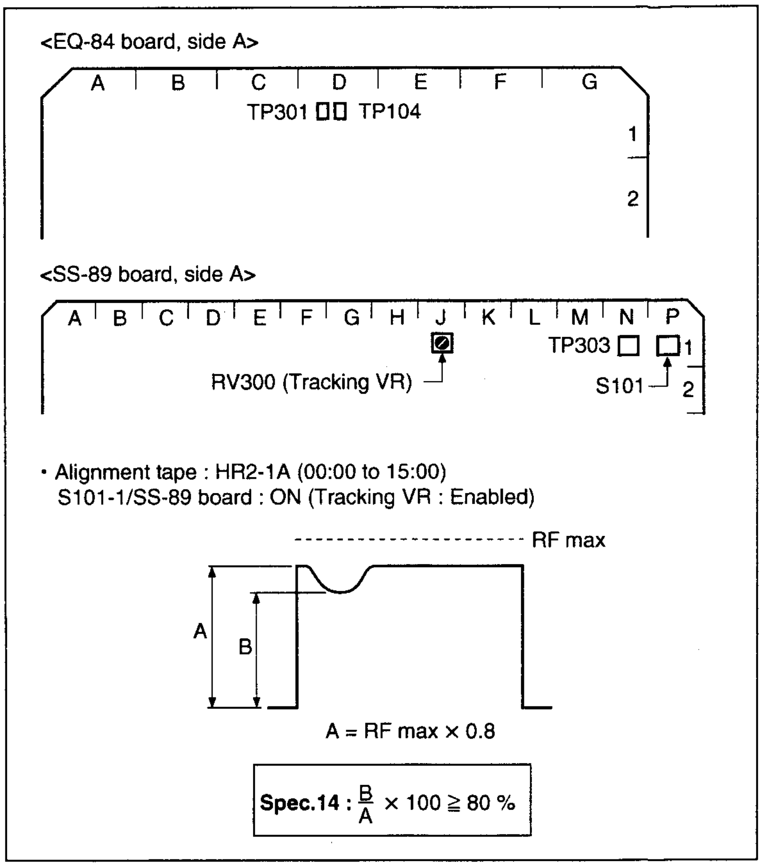
(20)Turn on the power, then play back the alignment tape (00:00 to 15:00) in the PLAY mode.

(21)Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(22)Check that the levels A and B shown in the figure satisfy specification 14.

(23)Reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

If specification 14 is not satisfied, perform the adjustment from (3) of step 1 and later again.



- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

A = RF max × 0.8

Spec.14 : $\frac{B}{A} \times 100 \geqq 80\ \%$

Tracking Adjustment

3. Check the Tape-running at the Tape Entrance Side

(1) Check the tape-running at the tape entrance side in each of the following modes:

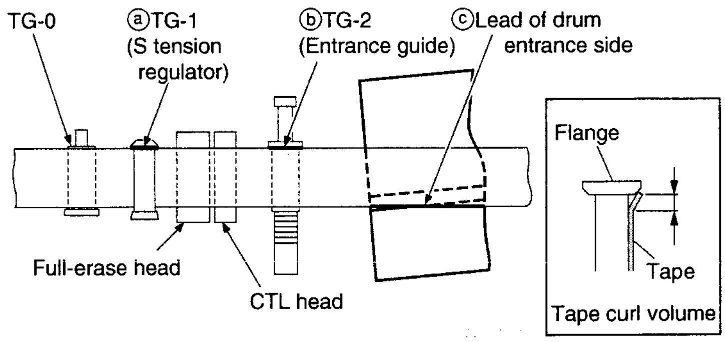
- PLAY mode
- F.FWD mode

If the curl of any of the tape guides does not satisfy specification 15, perform the adjustment from (3) of step 1 and later again.

(2) Check the tape-running at the tape entrance in each of the following modes:

- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the curl of any of the tape guides does not satisfy specification 16, perform the adjustment from (3) of step 1 and later again.



Spec.15 : ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.16 : ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at the Tape Entrance Side

4. Recheck the Video Tracking

Perform steps from 3 to 11 in Section 6-4-1.

Note

After adjusting, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-4-3. Tracking Adjustment at the Tape Exit Side

This adjustment should be performed when the specifications have not been satisfied in Section 6-4-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-4-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied.
Perform adjustments paying attention to the following:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.

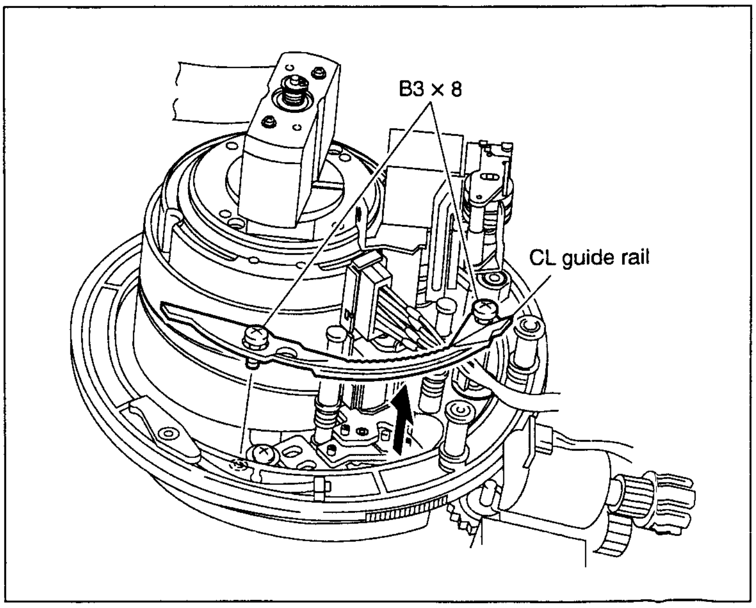
1. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws to remove the CL guide rail.

Notes

- When removing the CL guide rail, be careful not to damage the tape.
- Do not pull out the screws because the screw holes on the CL guide rail are shaped in such a way to prevent screws from falling.



CL Guide Rail Removal

2. Adjust the Tracking at the Tape Exit Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(2) Turn on the power, then play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) to set the center of the RF envelope waveform to the maximum output level.

(4) Turn the height adjustment nut of TG-3 counterclockwise by one to two turns so that the tape does not in contact with the upper flange of TG-3.

Note

Don't turn excessively the nut, or the tape bottom edge does in contact with the lower flange of TG-3.

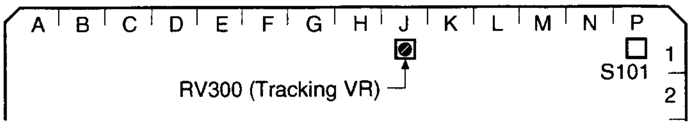
(5) Turn the height adjustment nut of TG-4 clockwise so that the tape does not in contact with the lower flange of TG-4.

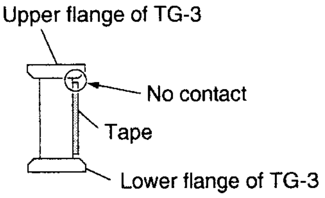
(6) Check that the RF envelope waveform satisfies the specification 17. (Fig. 1)
If satisfied, perform the step (8) and later.
If not, perform the step (7) and later.

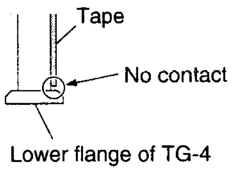
(7) Turn the zenith adjustment screw of the AT head so that the right portion of the RF envelope waveform makes 60 % or less of the maximum output level. (specification 17)
At this time, check that the tape does not in contact with both upper flange of TG-3 and lower flange of TG-4.
If the tape contacts either flange, repeat step (4) or (5).
If the tape moves upward or downward following the guide flange movement, perform the following adjustment.
This trouble cause is uneven tape tension at upside or downside of the tape caused by AT head zenith.

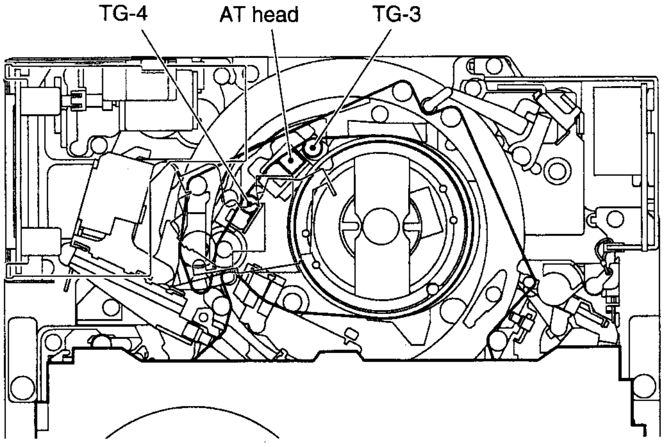
- If the tape moves upward at TG-3:
  Turn the zenith adjustment screw counterclockwise.
- If the tape moves downward at TG-4:
  Turn the zenith adjustment screw clockwise.

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
S101
2
RV300 (Tracking VR)

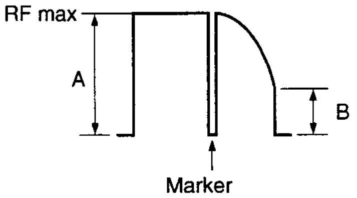

Upper flange of TG-3
No contact
Tape
Lower flange of TG-3


Tape
No contact
Lower flange of TG-4

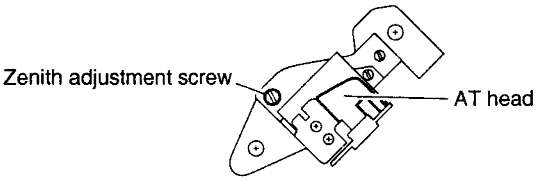

TG-4
AT head
TG-3

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>


RF max
A
B
Marker

Spec.17 : $\frac{B}{A} \times 100 = 30 \pm 30$ %


Zenith adjustment screw
AT head

(8) Turn the height adjustment nut of TG-3 clockwise so that the tape is in contact with the upper flange and the RF envelope waveform becomes flat. (Fig. 2)
Simultaneously, ensure that the tape does not in contact with the lower flange of TG-4.

If the waveform does not become flat, perform the steps ① to ③ (check and adjustment) below:

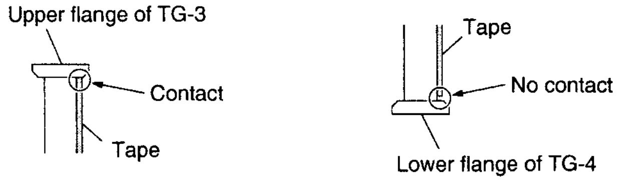
① Clean the drum lead with a wooden stick. (Refer to Section 4-2-4.)

② Press down the tape by wooden stick very lightly and check to see that the tape is running without aparting from the drum lead.

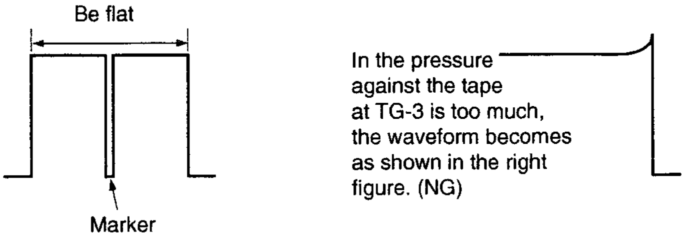
③ If the waveform does not become flat even after performing steps ① and ②, adjust the height of TG-3 so that the RF envelope waveform is nearly flat within the range of the specification 18 shown in the Fig.3. At this time, do not overpress the tape at TG-3.

Note

After adjusting the height of TG-3 in step ③ above, be sure to check the height of AT head (Refer to Section 6-4-6). If the AT head height does not satisfy the specification, repeat the video tracking adjustment.

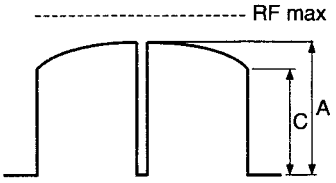


<Fig.2>



In the pressure against the tape at TG-3 is too much, the waveform becomes as shown in the right figure. (NG)

<Fig.3>



A = RF max × 0.8

Spec.18 : $\frac{C}{A} \times 100 \geqq 70$ %

(9) Adjust the height of TG-4 so that the lower flange of TG-4 in contact with the tape.

(10)Check the tape-running at the tape exit side in the following modes:

- PLAY mode
- F. FWD mode
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

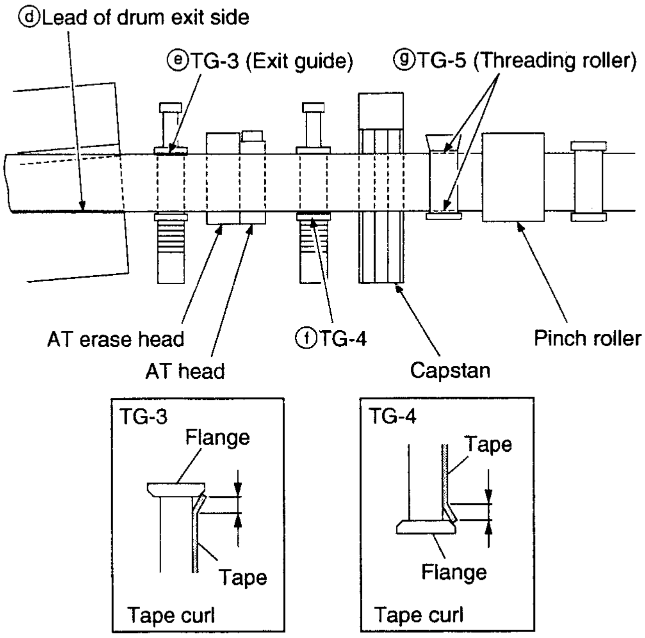
If the tape curl at TG-3 does not satisfy the specification 19, perform the steps ① and ② (adjustment) below.

① Change the zenith of the AT head within the range of the specification 17.
(Refer to previous step (7).)

② Perform the tracking adjustment again.
(Refer to previous steps (2) through (10).)

(11)If the AT head zenith was changed in above ①, perform the checks and adjustments described below:

- AT head height (Refer to Section 6-4-6.)
- AT head azimuth
  (Refer to Section 6-4-7 for HDW-M2000/P and HDW-S2000/P.)
  (Refer to Section 6-4-8 for HDW-2000/D2000.)
- AT head head-to-tape contact
  (Refer to Section 6-4-9.)
- AT head position
  (Refer to Section 6-4-10.)



Spec.19 : ⓓ Lead of drum exit side
The tape runs without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5 (Threading roller)
The tape runs without any curl at the upper and lower flanges.

Tracking Adjustment at the Tape Exit Side

3. Attach the CL Guide Rail

Turn off the power, then attach the CL guide rail.

4. Recheck the Video Tracking

Perform the steps 4 through 11 in Section 6-4-1 again.

Note

After adjustment, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-4-4. CTL Head Height Check and Adjustment

Tools

- Alignment tape HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.
(3) Turn on the power.

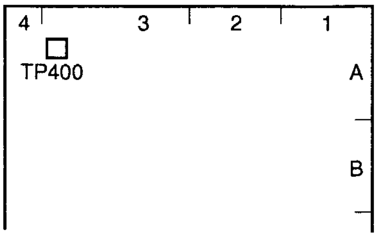
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
TIME: 5 ms/DIV

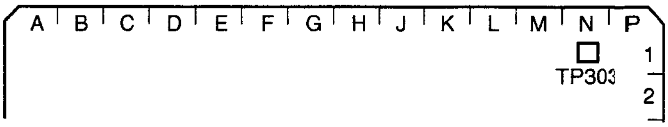
- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>



<SS-89 board, side A>



Preparation

Check

3. Check the CTL Head Height

Note

Never rotate the screw of portion C shown in the figure, or that might cause malfunctioning of tape running and head performance.

(1) Play back the alignment tape HR2-1A (15:00 to 25:00) in the PLAY mode.

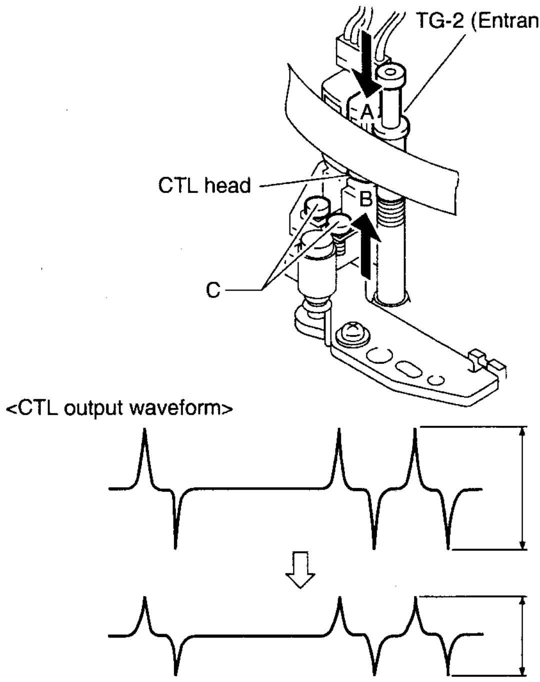
(2) Press down the portion A of the tape shown in figure, and then check to see that the level decreases by pressing the tape.

If the level increases, perform step 4-Ⓐ.

(3) Push up the portion B of the tape, and then check to see that the level decreases by pushing the tape.

If the level increases, perform step 4-Ⓑ.

- Alignment tape : HR2-1A (15:00 to 25:00)



Spec. : The level decreases when pressing down and when pushing up the alignment tape.

CTL Head Height Check

Adjustment

4. CTL Head Height Adjustment

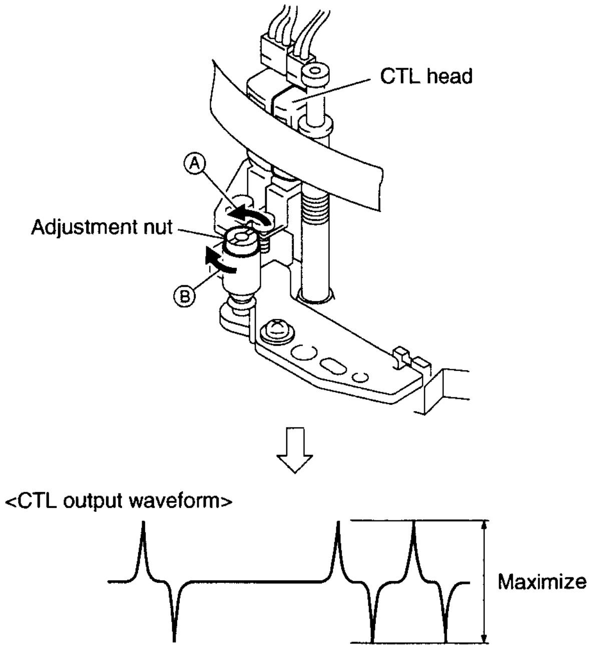
Ⓐ When the Level Increased by Pressing Down the Tape

Turn the adjustment nut counterclockwise (in the arrow Ⓐ direction) so that the output waveform is maximum.

Ⓑ When the Level Increases by Pushing Up the Tape

Turn the adjustment nut clockwise (in the arrow Ⓑ direction) so that the output waveform is maximum.

- Alignment tape : HR2-1A (15:00 to 25:00)



CTL Head Height Adjustment

6-4-5. CTL Head Position Check and Adjustment

Precaution

The CTL head position adjustment is closely related to the AT head position adjustment.
Be sure to confirm the AT head position after adjusting the CTL head position.

Tools

- Alignment tape HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252): J-6252-520-A
- Torque screwdriver's bit (+3 mm, l = 90 mm): J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.

(3) Turn on the power.

2. Connect the Oscilloscope

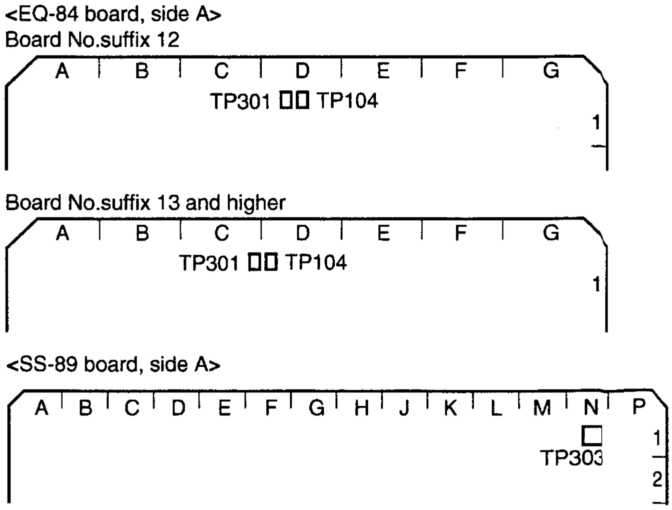
Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board (REC AC ENV signal)
CH-2: TP104/EQ-84 board (REC AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

Oscilloscope setting:
CH-1: 500 mV to 1 V/DIV
TRIG: 5 V/DIV
TIME: 2 ms/DIV

- Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)


<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP301
TP104
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP301
TP104
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
TP303
1
2

Preparation

Check

3. Check the CTL Head Position

(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker shown in the figure is appeared following the positive slope of the CF4 signal. (Specification 1)

Note

The RF envelope waveform is recorded on HR2-1A (00:00 to 15:00) only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

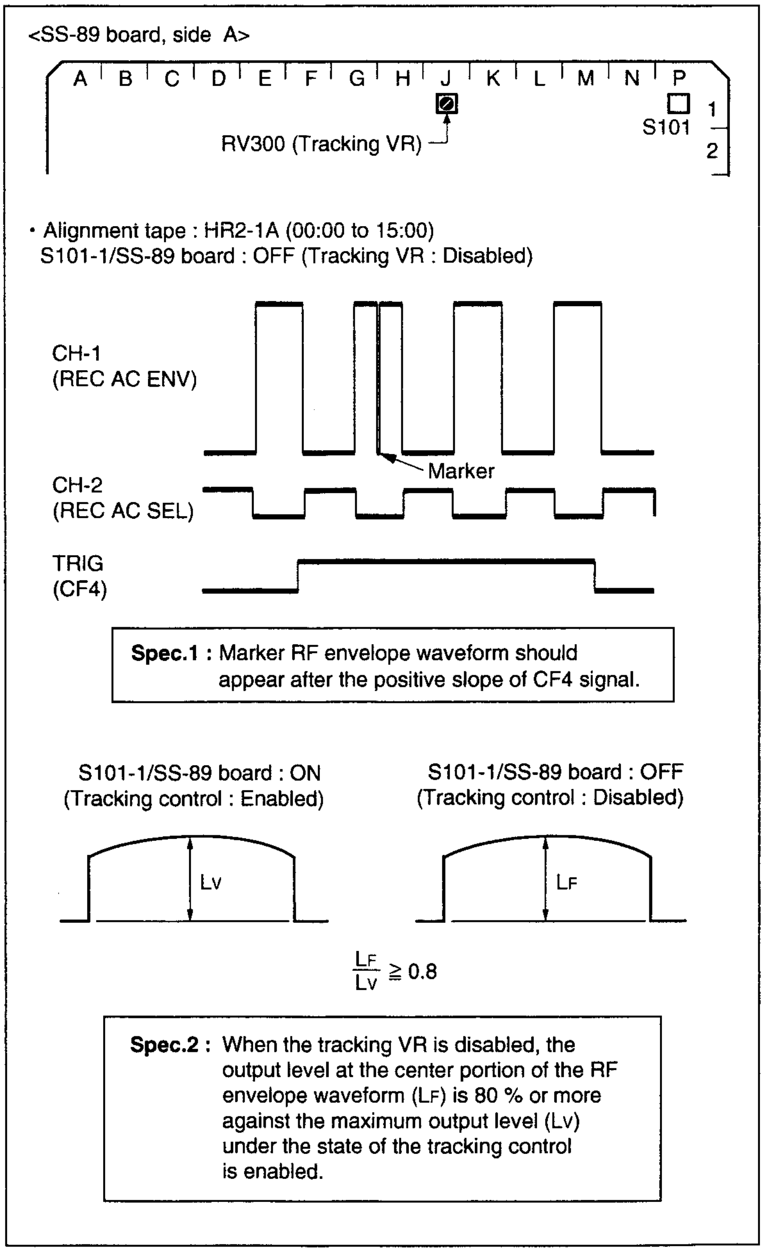
(4) Rotate the tracking VR (RV300/SS-89 board) until the output level at the center of the RF envelope with the marker confirmed in step (2) becomes maximum, and read the level (Lv) at that time.

(5) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(6) Read the output level (LF) at the center of the RF envelope waveform.

(7) Check that the level (Lv) read at step (4) and the level (LF) read at step (6) satisfy specification 2.

If they are without the specification, perform following step 4 and later.


<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300 (Tracking VR)
S101
1
2
CH-1
(REC AC ENV)
Marker
CH-2
(REC AC SEL)
TRIG
(CF4)
S101-1/SS-89 board : ON
(Tracking control : Enabled)
S101-1/SS-89 board : OFF
(Tracking control : Disabled)
Lv
LF

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

Spec.1 : Marker RF envelope waveform should appear after the positive slope of CF4 signal.

$$\frac{L_F}{L_V} \geqq 0.8$$

Spec.2 : When the tracking VR is disabled, the output level at the center portion of the RF envelope waveform (LF) is 80 % or more against the maximum output level (Lv) under the state of the tracking control is enabled.

CTL Head Position Check

Adjustment

Note

Ensure that the tracking control is disabled (S101-1/SS-89 board ⇨ OFF) before following adjustment.

4. Adjust the CTL Head Position

(1) Loosen the securing screw of the CTL/FE head assembly by 1/4 to 1/2 turn.

(2) Insert a 3 mm flatbladed screwdriver into the notch of the CTL/FE head assembly.

(3) Adjust the CTL/FE head assembly position so that the output level at the center portion is maximum and the marker appears in the RF envelope waveform following the positive slope of the CF4 signal. (Specification 3)

Note

The RF envelope waveform is recorded on HR2-1A (00:00 to 15:00) only for A ch.

(4) Tighten the screw loosened in step (1).

Tightening torque: 98 × 10^{-2} N•m
{10.0 kgf • cm}

5. Recheck the CTL Head Position

Perform step 3 again.

Note

After adjustment, be sure to reset Bit-1 of the Dip switch S101 on the SS-89 board to OFF (pushed down).

After the Adjustment

6. Adjust Drum Phase

Refer to Section 7-2-3.

7. Adjust Digital DT System

Refer to Section 7-2-5.

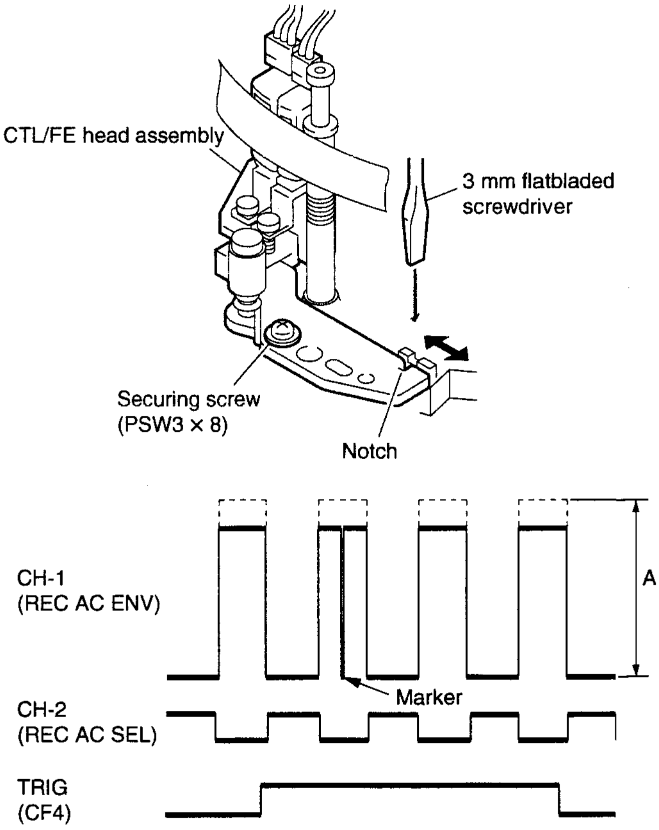
8. Adjust Analog DT System

Refer to Section 7-2-8.
(For HDW-2000/D2000: Not required)

9. Adjust the AT Head Position

Refer to Section 6-4-10.

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.3 : Make the portion A to the maximum level.

CTL Head Position Adjustment

6-4-6. AT Head Height Check and Adjustment

Precaution

The AT head height adjustment is closely related to the azimuth adjustment, head-to-tape contact adjustment, and head position adjustment.
Be sure to adjust (or check) these related portions according to “After the Adjustment” in this section after adjusting the AT head height.

Tools

- Alignment tape
  - For HDW-M2000, S2000: CR8-1A: 8-960-097-45
  - For HDW-M2000P, S2000P: CR8-1A PS: 8-960-098-45
  - For HDW-2000/D2000: HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape and put a weight (about 1000 g) onto it.
For HDW-M2000, S2000: CR8-1A
For HDW-M2000P, S2000P: CR8-1A PS
For HDW-2000/D2000: HR2-1A
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

For HDW-M2000/P, S2000/P:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

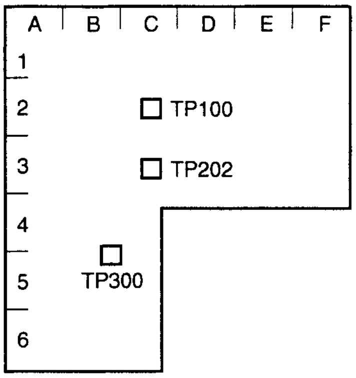
For HDW-2000/D2000:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

For HDW-M2000/P, S2000/P:
CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

For HDW-2000/D2000:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Height

For HDW-M2000/P, S2000/P:

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly press down the portion A of the tape shown in the figure, and check to see that both levels in CH-1 and CH-2 decrease by pressing the tape.

If both levels increase, perform step 4-Ⓐ.

(3) Slightly push up the portion B of the tape, and check to see that both levels in CH-1 and CH-2 decrease by pushing the tape.

If both levels increase, perform step 4-Ⓑ of next page.

For HDW-2000/D2000:

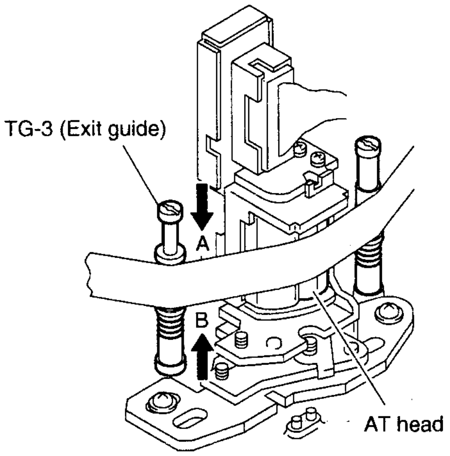
(1) Play back the 1 kHz, 0 VU signal portion (00:00 to 15:00) on the HR2-1A in the PLAY mode.

(2) Slightly press down the portion A shown in the figure, and check to see that the CUE level decreases by pushing the tape.

If the level increases, perform step 4-Ⓐ of next page.

(3) On the contrary, slightly push up the portion B of the tape, and check to see that the CUE level decreases by pushing the tape.

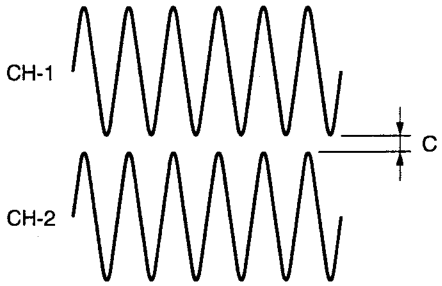
If the level increases, perform the step 4-Ⓑ.



AT Head Height Check

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)

<Audio output waveform>

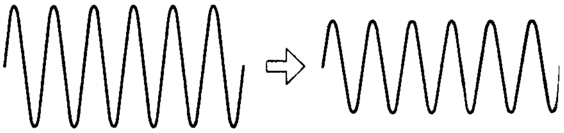


Spec. : The portion C widens when pressing down and when pushing up the alignment tape.

Specification for HDW-M2000/P, S2000/P

- Alignment tape : HR2-1A (00:00 to 15:00)

<CUE output waveform>



Spec. : The level decreases when the tape is moved up and down.

Specification for HDW-2000/D2000

Adjustment

4. AT Head Height Adjustment

Ⓐ When the Level Increases by Pressing Down the Tape

Turn the height adjustment screw clockwise so that the output level is maximum. (Fig. 1)
(For HDW-M2000/P and S2000/P, make the portion C minimize.)

Ⓑ When the Level Increases by Pushing Up the Tape

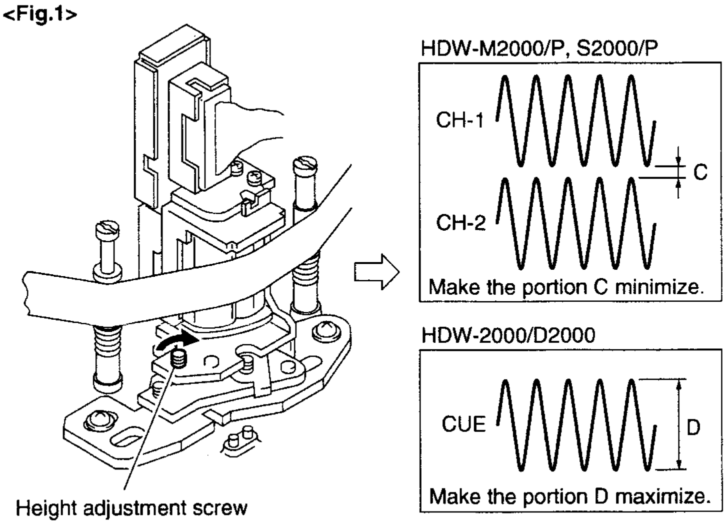
(1) Turn the height adjustment screw counter-clockwise to maximize the output level.
Turn the height adjustment screw counter-clockwise furthermore to decrease the output level slightly. (Arrow ① in Fig. 2)

(2) Turn the height adjustment screw clockwise and adjust so that the output level is maximum. (Arrow ② in Fig. 2)
(For HDW-M2000/P and S2000/P, make the portion C minimize.)

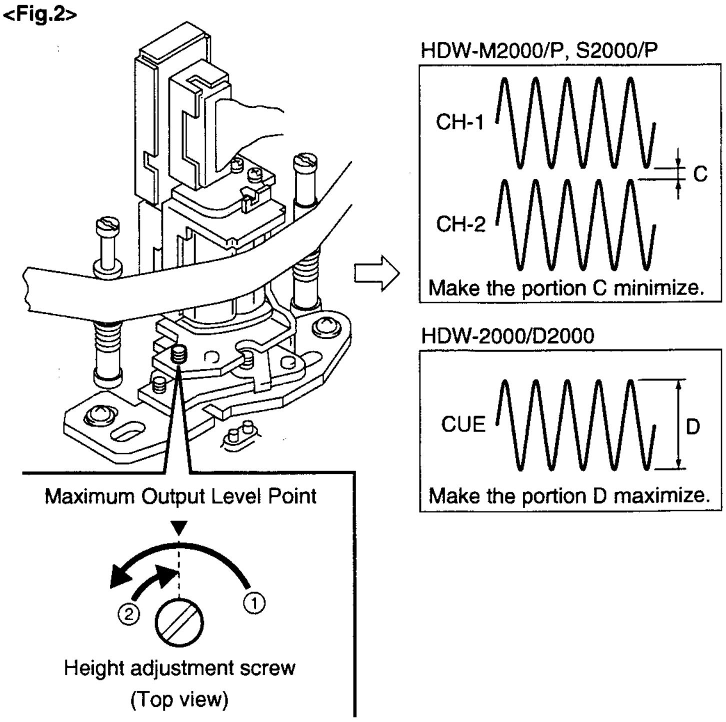
Note

To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved upward (with the height adjustment screw turned clockwise).

<Fig.1>


HDW-M2000/P, S2000/P
CH-1
CH-2
C
Make the portion C minimize.
HDW-2000/D2000
CUE
D
Make the portion D maximize.
Height adjustment screw

<Fig.2>


HDW-M2000/P, S2000/P
CH-1
CH-2
C
Make the portion C minimize.
HDW-2000/D2000
CUE
D
Make the portion D maximize.
Maximum Output Level Point
②
①
Height adjustment screw
(Top view)

AT Head Height Adjustment

After the Adjustment

5. Adjust the AT Head Azimuth

For HDW-M2000/P and S2000/P, refer to Section 6-4-7.
For HDW-2000/D2000, refer to Section 6-4-8.

6. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-4-9.

7. Adjust the AT Head Position

Refer to Section 6-4-10.

8. Recheck the AT Head Height

Refer to step 3 in this section.

9. Recheck the AT Head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-4-7. AT Head Azimuth Check and Adjustment (for HDW-M2000/P, S2000/P)

Precautions

- The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
  Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.
- For HDW-2000/D2000, perform Section 6-4-8.

Tools

- Alignment tape

CR8-1A (for HDW-M2000, S2000):	8-960-097-45
CR8-1A PS (for HDW-M2000P, S2000P):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

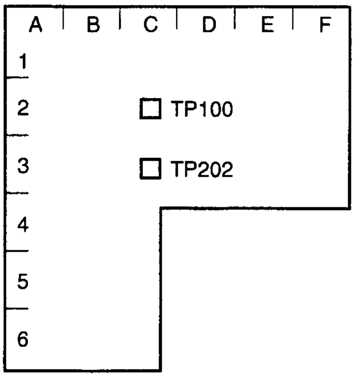
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 100 mV/DIV
CH-2: 100 mV/DIV
MODE: X-Y

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

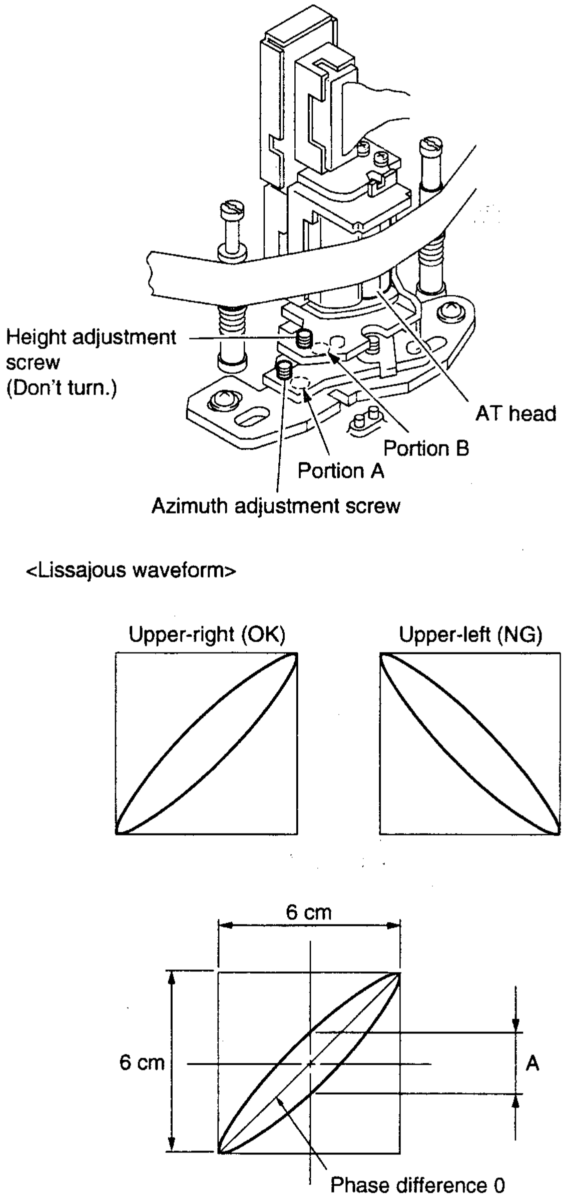
3. Check the AT Head Azimuth

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.
(2) Adjust the horizontal and vertical amplitudes of lissajous waveform displayed on the oscilloscope to six cm each.
(3) Check that the lissajous waveform holds the upper-right shape.
(4) Check that the vertical amplitude at the center point in the horizontal direction satisfies the specification.

If the specification in figure is not satisfied, perform following steps 4 and later.

(5) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

- Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : $A \leqq 0.52$ cm

AT Head Azimuth Adjustment

Adjustment

4. Adjust the AT Head Azimuth

(1) Turn the azimuth adjustment screw so that the specification is satisfied.
(2) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

After the Adjustment

5. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-4-9.

6. Adjust the AT Head Position

Refer to Section 6-4-10.

7. Check the AT Head Height

Refer to Section 6-4-6.

8. Check the AT Head Azimuth

Refer to step 3 in this section.

9. Recheck the AT head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-4-8. AT Head Azuimuth Check and Adjustment (for HDW-2000/D2000)

Precautions

- The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
  Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.
- For HDW-M2000/P and S2000/P, perform Section 6-4-7.

Tools

- Alignment tape HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the HR2-1A, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

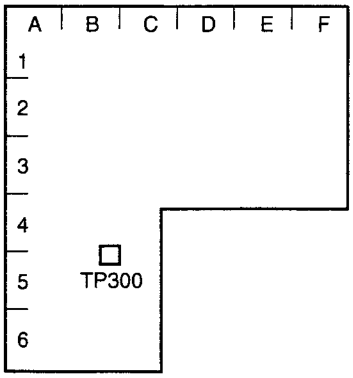
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

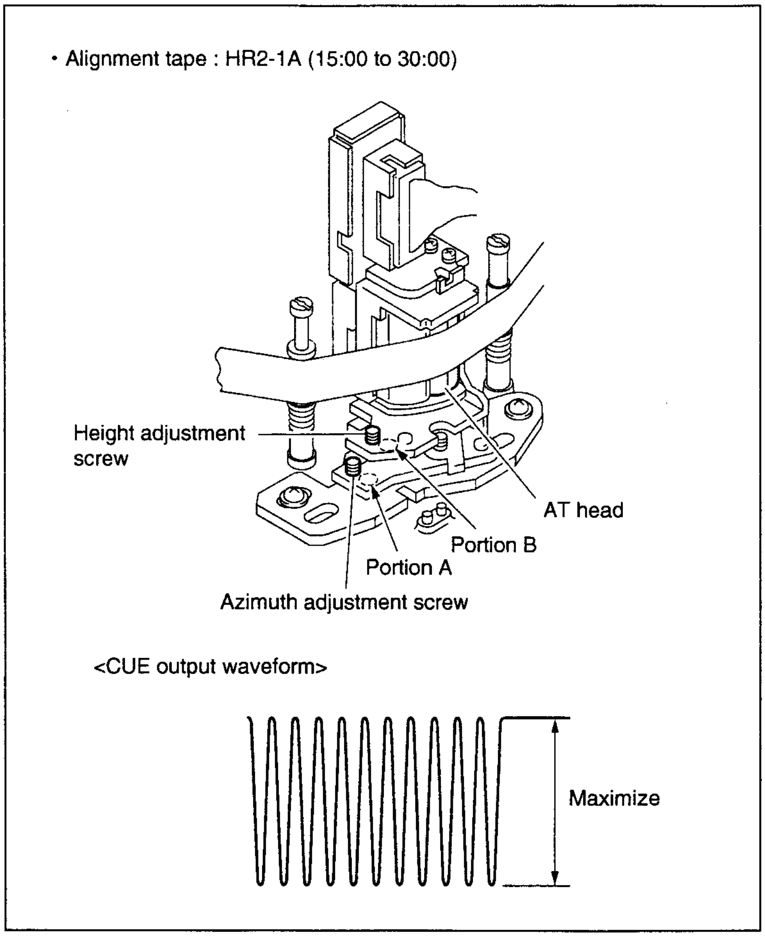
Adjustment

3. Adjust the AT Head Azimuth

(1) Play back the 12 kHz, 0 VU signal portion (15:00 to 30:00) on the HR2-1A in the PLAY mode.

(2) Turn the azimuth adjustment screw so that the output waveform level becomes maximum.

(3) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the output waveform level is maximum.


• Alignment tape : HR2-1A (15:00 to 30:00)
Height adjustment screw
AT head
Portion B
Portion A
Azimuth adjustment screw
<CUE output waveform>
Maximize

AT Head Azimuth Adjustment

After the Adjustment

4. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-4-9.

5. Adjust the AT Head Position

Refer to Section 6-4-10.

6. Check the AT Head Height

Refer to Section 6-4-6.

7. Apply the Locking Compound

Refer to Section 6-1-9.

6-4-9. AT Head Head-to-tape Contact Check and Adjustment

Precaution

The AT head head-to-tape contact adjustment is closely related to the head position adjustment, head height adjustment, and head azimuth adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head head-to-tape contact.

Tools

- Alignment tape
  - For HDW-M2000, S2000: CR8-1A: 8-960-097-45
  - For HDW-M2000P, S2000P: CR8-1A PS : 8-960-098-45
  - For HDW-2000/D2000: HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251): J-6252-510-A
- Torque screwdriver's bit (+2 mm, l = 75 mm): J-6323-420-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape, and put a weight (about 1000 g) onto it.
For HDW-M2000, S2000: CR8-1A
For HDW-M2000P, S2000P: CR8-1A PS
For HDW-2000/D2000: HR2-1A

(3) Turn on the power.

2. Connect the Oscilloscope

For HDW-M2000/P, S2000/P:
Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

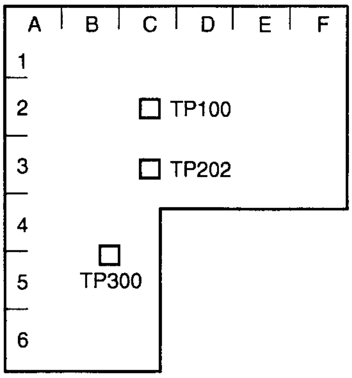
For HDW-2000/D2000:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

For HDW-M2000/P, S2000/P:
CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

For HDW-2000/D2000:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Head-to-tape Contact

For HDW-M2000/P, S2000/P:

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

(3) Check that both increased amount of the output levels in CH-1 and CH-2 satisfy the specification.

If the specification is not satisfied, perform following steps 4 and later.

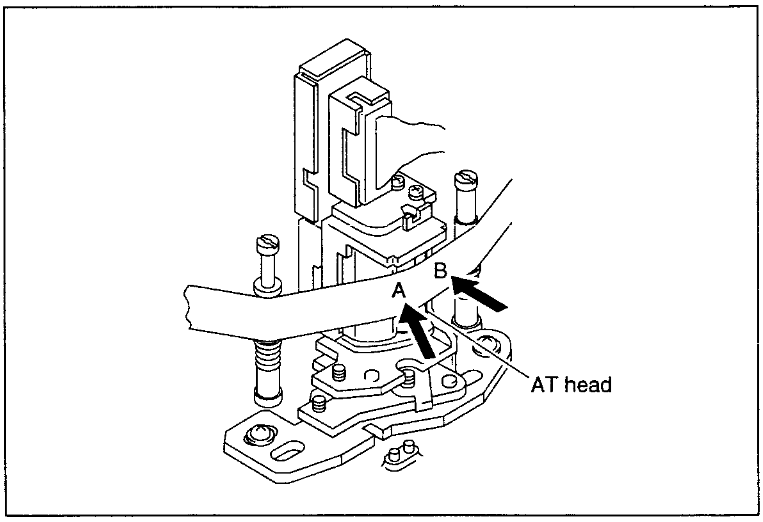
For HDW-2000/D2000:

(1) Play back the 12 kHz, 0 VU signal portion (15:00 to 30:00) on the HR2-1A in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

(3) Check that the increased amount of output level satisfies the specification.

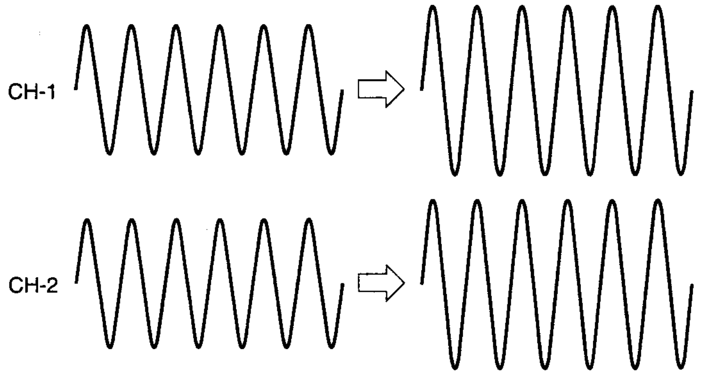
If the specification is not satisfied, perform steps 4 and later.



AT Head Head-to-tape Contact Check

• Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)

<AUDIO output waveform>

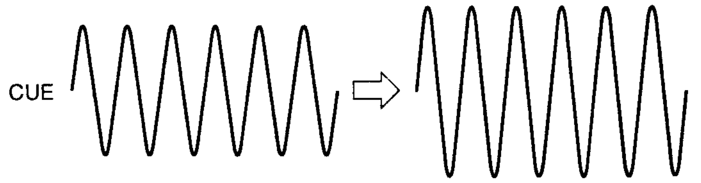


Spec. : Both increased amount of the output levels in CH-1 and CH-2 are within 5 %.

Specification for HDW-M2000/P, S2000/P

• Alignment tape : HR2-1A (15:00 to 30:00)

<CUE output waveform>



Spec. : Increased amount of the output level is within 5 %.

Specification for HDW-2000/D2000

Adjustment

4. Adjust the AT Head Head-to-tape Contact

(1) Loosen the two head securing screws by 1/4 to 1/2 turn.
(2) Insert a 2 mm flatbladed screwdriver into the notch of the adjustment plate.
(3) Adjust the AT head position to maximize the output level.
(4) Tighten the two securing screws loosened in step (1).

Tightening torque: 19.6×10^{-2} N·m
{2 kgf·cm}

5. Recheck the AT Head Head-to-tape Contact

Perform to previous step 3 in this section again.

After the adjustment

6. Check the AT Head Position

Refer to Section 6-4-10.

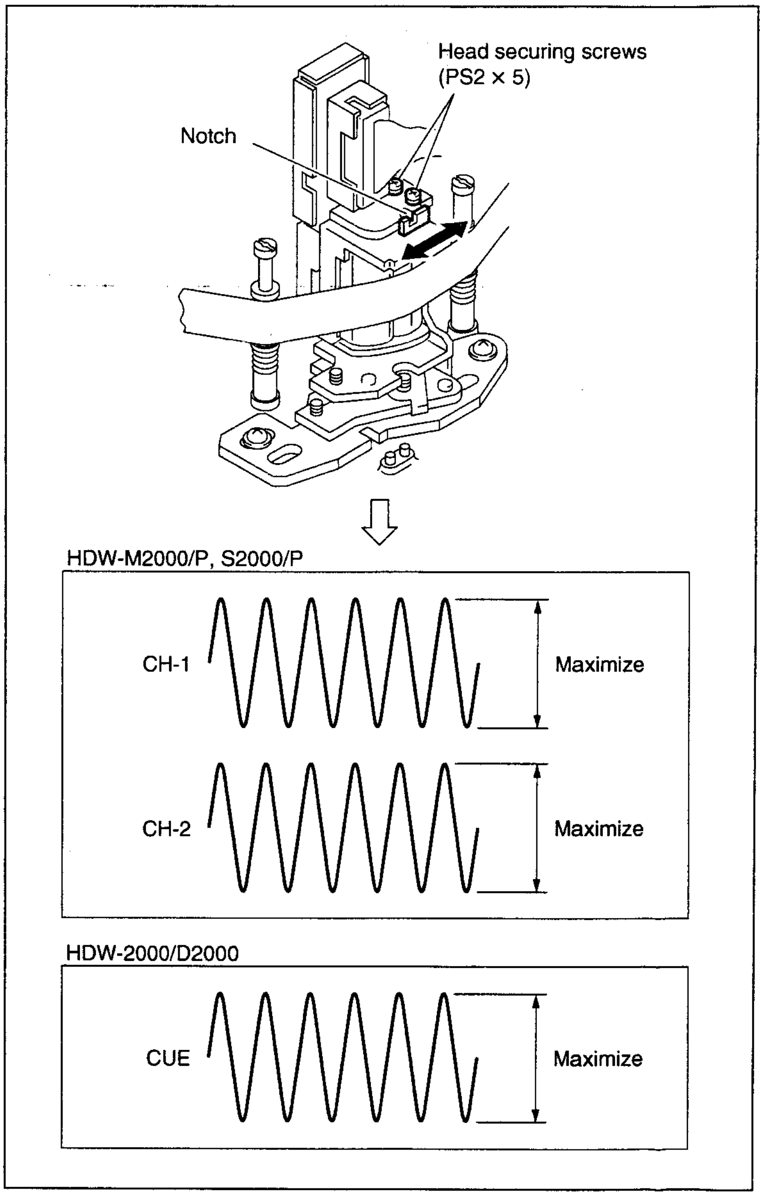
7. Check the AT Head Height

Refer to Section 6-4-6.

8. Check the AT Head Azimuth

For HDW-M2000/P, S2000/P, refer to Section 6-4-7.

For HDW-2000/D2000, refer to Section 6-4-8.


Head securing screws
(PS2 x 5)
Notch
HDW-M2000/P, S2000/P
CH-1
Maximize
CH-2
Maximize
HDW-2000/D2000
CUE
Maximize

AT Head Head-to-tape Contact Adjustment

6-4-10. AT Head Position Check and Adjustment

Precautions

- The CTL head position adjustment should be completed before performing this adjustment. The AT head position is adjusted relative to the CTL head position as reference.
- The AT head position adjustment is closely related to the head height adjustment, head azimuth adjustment, and head-to-tape contact adjustment. Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head position.

Tools

- Alignment tape HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252): J-6252-520-A
- Torque screwdriver's bit (+3 mm, l = 90 mm): J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

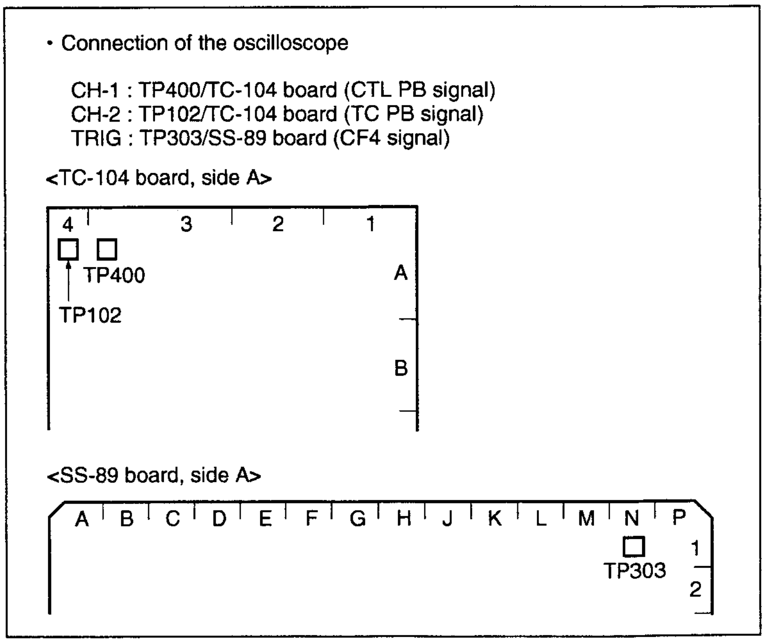
(2) Set the alignment tape HR2-1A, and put a weight (about 1000 g) onto it.

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

CH-1: TP400/TC-104 board (CTL PB signal)
CH-2: TP102/TC104 board (TC PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
CH-2: 2 V/DIV
TIME: 10 ms to 500 μs/DIV



- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>

<SS-89 board, side A>

Preparation

Check

3. Check the AT Head Position

(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

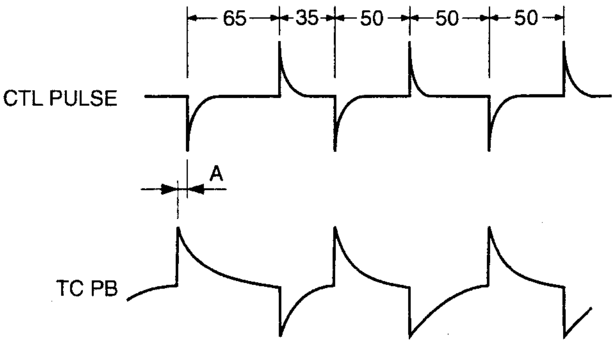
(2) Check that the positional relationship between the rising edges of CTL's 65:35 pulse and TC PB's 65:35 waveform signals satisfies the specification.

If the specification is not satisfied, perform the following steps beginning with step 4.

Note

The TC signal is in 0.15 ms advance of the CTL signal.

- Alignment tape : HR2-1A (00:00 to 15:00)



Spec. (for check) : A = 0.15 ±2.40 ms

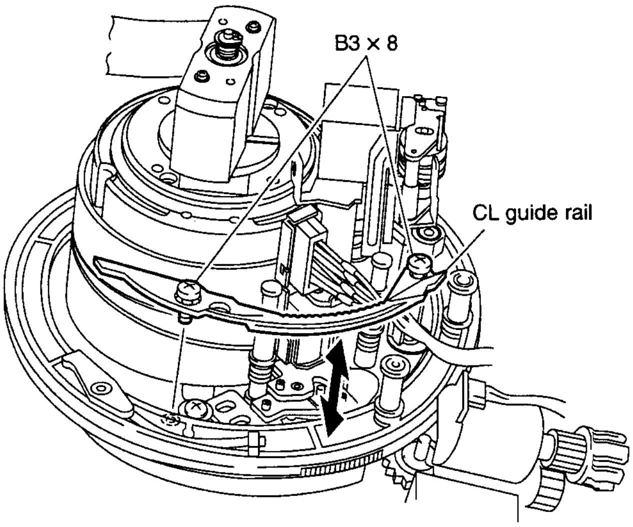
AT Head Position Check

Adjustment

4. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws, then remove the CL guide rail.



CL Guide Rail Removal/Reattachment

5. Adjust the AT Head Position

(1) Loosen the two screws of the AT head assembly by 1/4 to 1/2 turn.

(2) Turn on the power, then play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Insert a 3 mm flat-blade screwdriver into the notch of the AT head assembly.

(4) Adjust the AT head assembly position so that the specification is satisfied.

Notes

- The specifications for AT head position check and position adjustment differ. When adjusting, apply the specification of AT head position adjustment.
- The TC signal is 0.15 ms ahead of the CTL signal.

(5) Tighten the two screws loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf•cm}

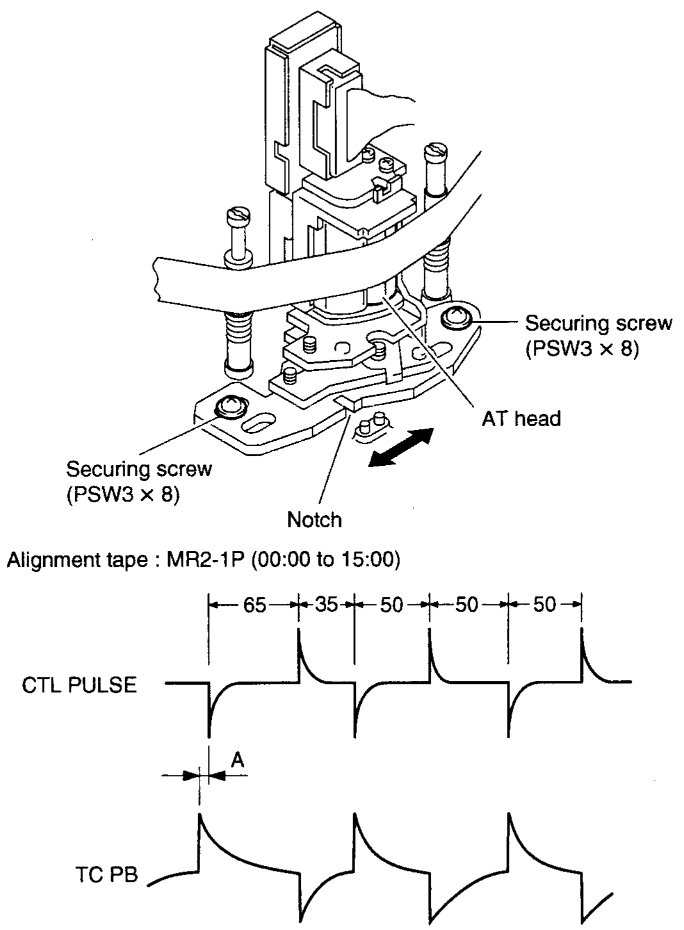
6. Recheck the AT Head Position

Perform step 3 in this section again.

7. Attach the CL Guide Rail

(1) Turn off the power, then remove the alignment tape.

(2) Attach the CL guide rail with two screws.



- Alignment tape : MR2-1P (00:00 to 15:00)

Spec. (for adjustment) : A = 0.15 ±0.40 ms

AT Head Position Adjustment

After the Adjustment

8. Check the AT Head Height

Refer to Section 6-4-6.

9. Check the AT Head Azimuth

For HDW-M2000/P, S2000/P, refer to Section 6-4-7.

For HDW-2000/D2000, refer to Section 6-4-8.

10. Check the AT Head Head-to-tape Contact

Refer to Section 6-4-9.

11. Check the AT Head Position

Refer to step 3 in this section.

12. Apply the Locking Compound

Refer to Section 6-1-9.

6-4-11. Audio/CUE Level Check and Adjustment in REV Mode

Tools

- Alignment tape
  - For HDW-M2000, S2000: CR8-1A : 8-960-097-45
  - For HDW-M2000P, S2000P: CR8-1A PS: 8-960-098-45
  - For HDW-2000/D2000: HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape and put a weight (about 1000 g) onto it.

For HDW-M2000, S2000: CR8-1A
For HDW-M2000P, S2000P: CR8-1A PS
For HDW-2000/D2000: HR2-1A

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

For HDW-M2000/P, S2000/P:
CH-1: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

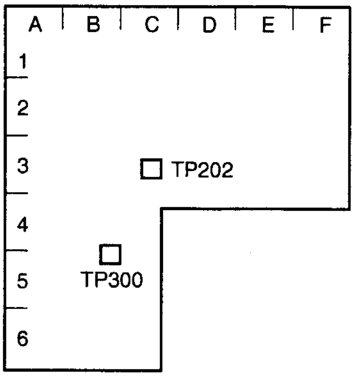
For HDW-2000/D2000:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

For HDW-M2000/P, S2000/P:
CH-1 : TP202/AE-31 board (CH-2 PB signal)

For HDW-2000/D2000:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

3. Check the Audio Output Level

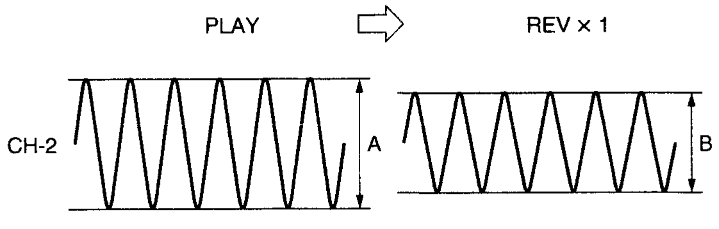
Note

This step is for HDW-M2000/P, S2000/P.

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS.
(2) Check the audio output level A in CH-2.
(3) Set the REV × 1 mode.
(4) Check that the audio output level B in CH-2 satisfies specification 1.

If specification 1 is not satisfied, perform following steps 5 and later.

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec.1 : $\frac{B}{A} \times 100 \geqq 90$ %

Audio Level Check in REV Mode (HDW-M2000/P, S2000/P)

4. Check the CUE Output Level

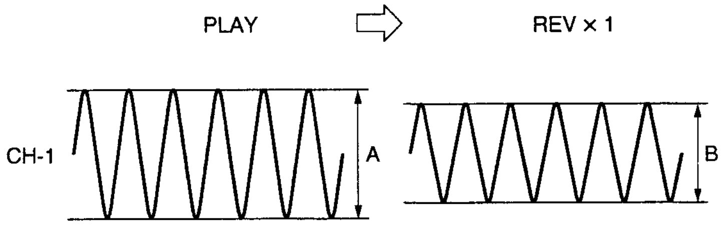
Note

This step is for the HDW-2000/D2000.

(1) Play back the 1 kHz, 0 VU signal portion (00:00 to 15:00) on the HR2-1A in the PLAY mode.
(2) Check the CUE output level A.
(3) Set the REV × 1 mode.
(4) Check that the CUE output level B satisfies the specification 1.

If specification 1 is not satisfied, perform following steps 5 and later.

- Alignment tape : HR2-1A (00 : 00 to 15 : 00)



Spec.1 : $\frac{B}{A} \times 100 \geqq 90$ %

CUE Level Check in REV Mode (HDW-2000/D2000)

Adjustment

5. Adjust the TG-5 (Threading Roller) Height

(1) Play back the 1 kHz, 0 VU signal portion on the alignment tape.
For HDW-M2000, S2000:
CR8-1A (8:00 to 10:00)
For HDW-M2000P, S2000P:
CR8-1A PS (8:00 to 10:00)
For HDW-2000/D2000:
HR2-1A (00:00 to 15:00)

(2) Set the REV × 1 mode.

(3) Slightly press down the portion A of the tape shown in figure, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 clockwise using a tape guide adjustment driver.

(4) Slightly push up the portion B of the tape, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 counterclockwise using the tape guide adjustment driver.

(5) Check the output level satisfies specification 1 (previous page).

If the specification 1 is not satisfied, repeat steps (1) through (4) mentioned above.

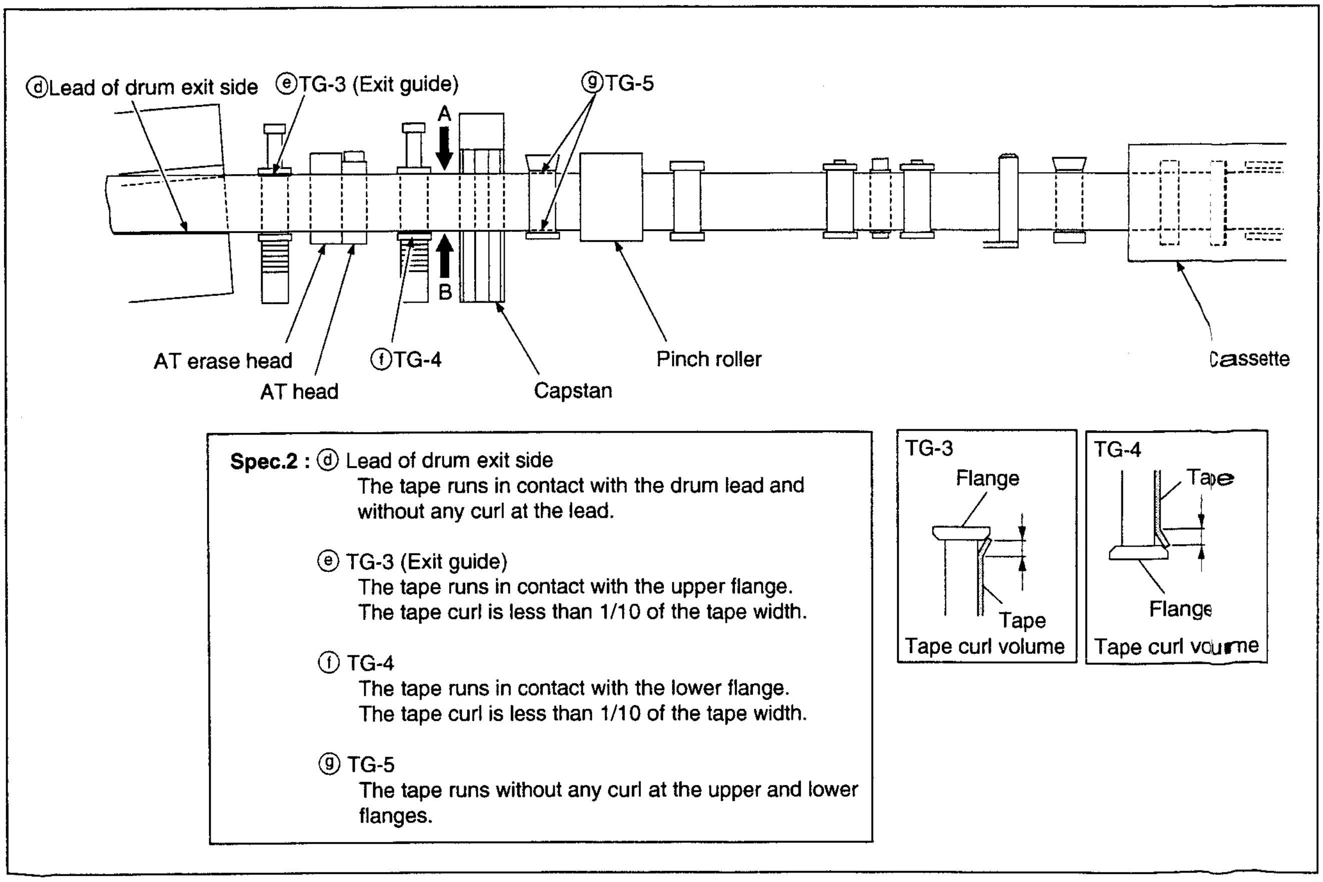
6. Check the Tape-running at Tape Exit Side

In the following modes, check that the tape-running condition satisfies specification 2.

- PLAY mode
- REV × 1 mode

If specification 2 is not satisfied, adjust the tape guides height at the tape exit side. (Refer to step 7 (at the Tape Exit Side) in Section 6-7-2.)

If the height of the tape guide is adjusted, perform the video tracking check.
(Refer to Section 6-4-1.)



Spec.2 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5
The tape runs without any curl at the upper and lower flanges.

Audio/CUE Level Adjustment in REV Mode

6-5. HDW Player Tape Path

Applicable models: HDW-M2100/M2100P

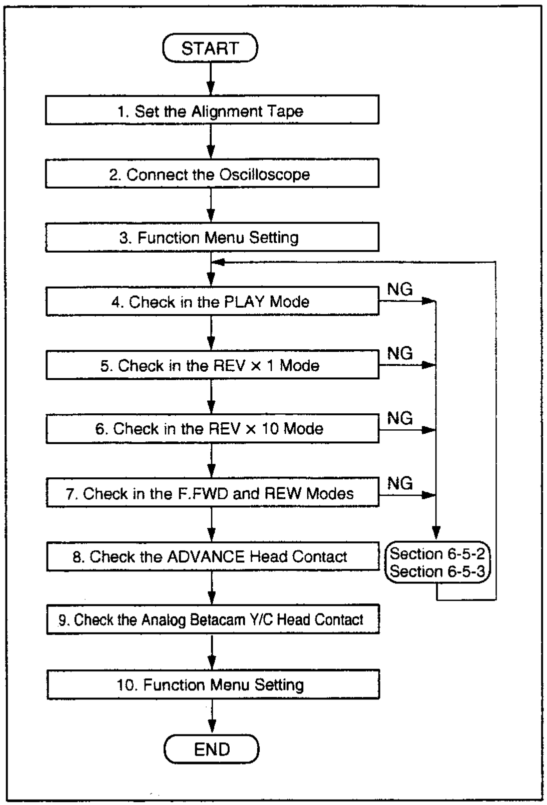
6-5-1. Video Tracking Check

Tools

- Alignment tapes
  - HR2-1A: 8-960-076-11
  - HR5-1A: 8-960-076-01
  - CR2-1B (for HDW-M2100 only): 8-960-096-01
  - CR2-1B PS (for HDW-M2100P only): 8-960-096-51
- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment screwdriver (MW-261): J-6322-610-A

Note

When checking video tracking, the RF envelope waveform (PLAY mode) should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments only when without the specifications.


START
1. Set the Alignment Tape
2. Connect the Oscilloscope
3. Function Menu Setting
4. Check in the PLAY Mode
NG
5. Check in the REV × 1 Mode
NG
6. Check in the REV × 10 Mode
NG
7. Check in the F.FWD and REW Modes
NG
8. Check the ADVANCE Head Contact
Section 6-5-2
Section 6-5-3
9. Check the Analog Betacam Y/C Head Contact
10. Function Menu Setting
END

Video Tracking Check/Adjustment Flow Chart

Setting

1. Set the Alignment Tape

(1) Press the switch S300 on the SS-89 board during power-on to set the reel tables to the S cassette position.

(2) Turn off the power.

(3) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.

2. Connect the Oscilloscope

- Connect the oscilloscope as follows:

CH1: TP601/EQ-84 board (ADV AC ENV signal)
CH2: TP100/EQ-84 board (ADV AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

- Oscilloscope setting:

CH-1: 500 mV to 1 V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

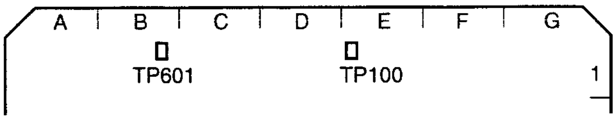
3. Function Menu Setting

Turn on the power, then set the F1 (CAPSTN) of function menu Page4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)

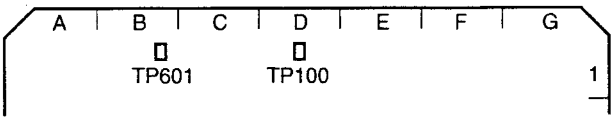
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP100/EQ-84 board (ADV AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)

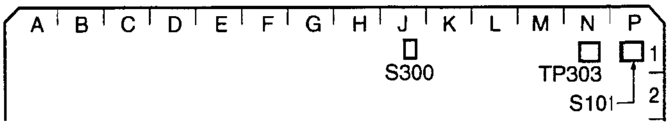
<EQ-84 board, side A>
Board No.suffix 12



Board No.suffix 13 and higher



<SS-89 board, side A>



Preparation

Check

4. Check in the PLAY Mode

(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker as shown in the figure appears following the positive slope of the CF4 signal.

Use this portion of the RF envelope waveform when checking video tracking in the PLAY mode.

If extremely abnormal waveform (Fig. 1) is output after replacing the upper drum assembly, remove and re-attach the upper drum assembly.

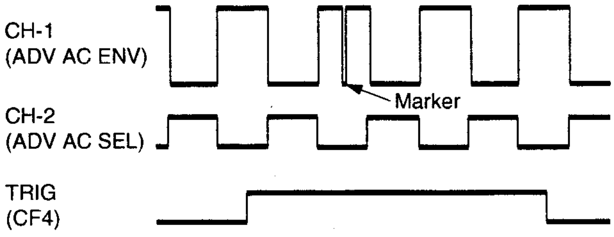
- Refference:
  Section 5-2. Upper Drum Assembly Replacement

Note

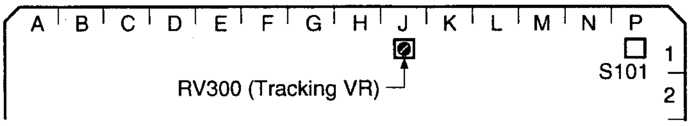
The ADV AC RF envelope waveform (ADV AC ENV) is output only for A ch.

(3) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

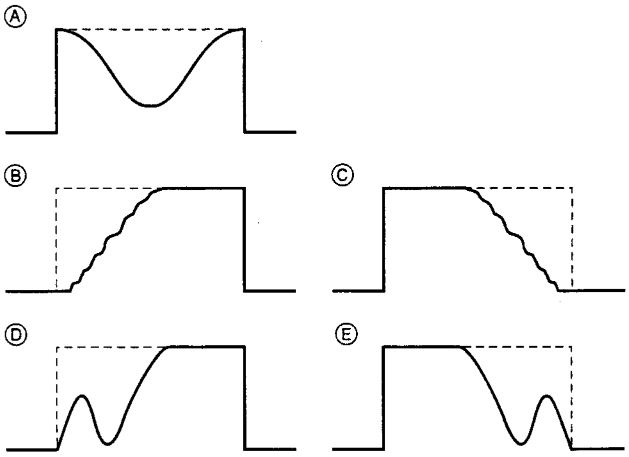
- Alignment tape : HR2-1A (00:00 to 15:00)



<SS-89 board, side A>



<Fig.1 : NG waveforms of AC ENV signal (Examples)>



(4) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(5) In the step (4) state, check to see that the RF envelope waveform satisfies specification 1.

Note

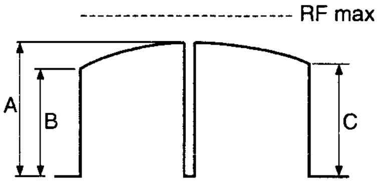
If the level fluctuates, read the average value.

(6) If the level fluctuates, rotate the tracking VR to maximize the output level at the center of the RF envelope waveform, and check that the fluctuation amount satisfies specification 2.

If specifications 1 and 2 are not satisfied, perform the adjustment in the Section 6-5-2 (Tape Entrance Side) or Section 6-5-3 (Tape Exit Side).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Head-to-tape contact>

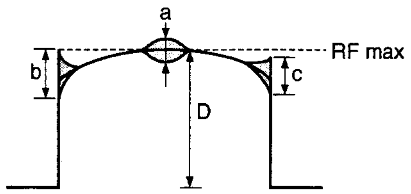


A = RF max × 0.8

Spec.1 : Output levels (B and C) at the tape entrance side and exit side are more than 70 % of the center level (A).

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$

<Fluctuation>



D = Average maximum level at waveform center

Spec.2 : Fluctuation amounts (a, b, c) at the drum center portion, entrance side and exit side are less than 20 % of the average maximum level (D).

$\frac{a}{D} \times 100 \leqq 20\ \%$ $\frac{b}{D} \times 100 \leqq 20\ \%$ $\frac{c}{D} \times 100 \leqq 20\ \%$

Video Tracking Check (PLAY)

5. Check in the REV × 1 Mode

(1) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(2) Play back the alignment tape HR2-1A (00:00 to 15:00).

(3) Set the REV × 1 mode, and check that the RF envelope waveform satisfies specification 3.

If the waveform at the entrance is without the specification 3, adjust tracking at the drum entrance. (Refer to Section 6-5-2.)
If the waveform at the exit is NG, adjust the height of TG-5 before tracking adjustment.

Note

Adjusting the height of TG-5
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

If the specification is still not satisfied, adjust tracking at the drum exit. (Refer to Section 6-5-3.)

(4) Also check that the tape is running with maintaining the state of the specification 4.

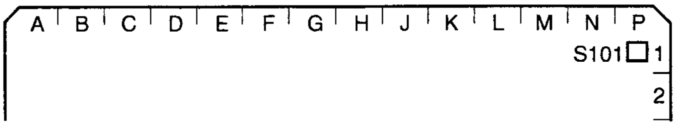
If specification 4 is not satisfied, first adjust the height of TG-5.

Note

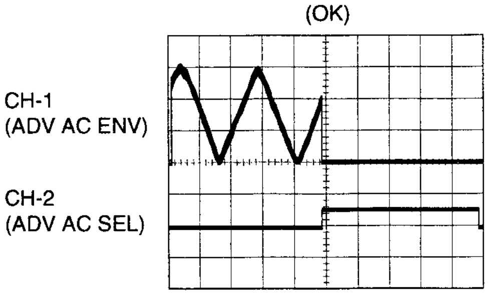
Adjusting the height of TG-5:
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

When the specification 4 is not still satisfied even after adjusting the height of TG-5, adjust the tracking at tape exit. (Refer to Section 6-5-3.)

<SS-89 board, side A>

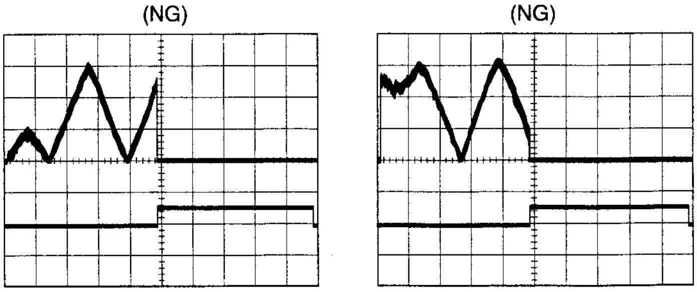


- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

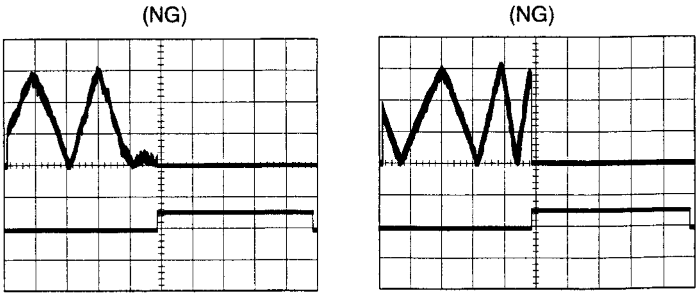


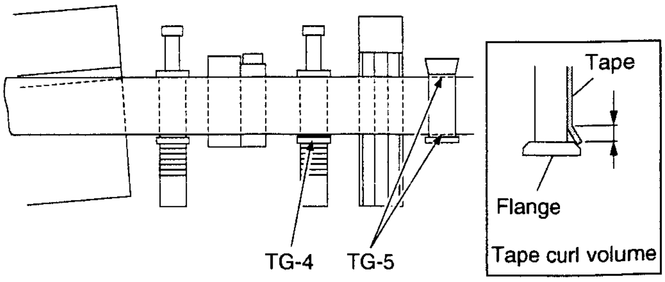
Spec.3 : Appears waveforms with no lacking.
Uniform waveforms without variation.

- In the case of the drum entrance side is NG (Example) :



- In the case of the drum exit side is NG (Example) :





Spec.4 : Lower flange of TG-4
The tape curl is less than 1/10 of the tape width.

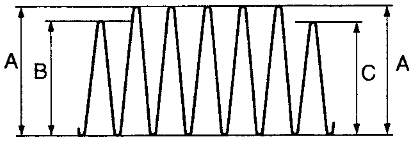
Video Tracking Check (REV x 1)

6. Check in the REV × 10 Mode

(1) Play back the alignment tape HR2-1A (00:00 to 15:00).
(2) Set the REV × 10 mode, and check that the RF envelope waveform satisfies specification 5.

If specification 5 is not satisfied, perform the adjustment in the Section 6-5-2 (Tape Entrance Side) or Section 6-5-3 (Tape Exit Side).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.5 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)

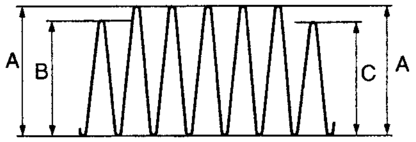
Video Tracking Check (REV × 10)

7. Check in the F.FWD and REW Modes

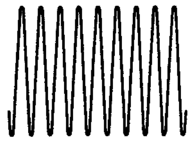
(1) Play back the alignment tape HR2-1A (00:00 to 15:00).
(2) Set the F.FWD mode, and check that the RF waveform satisfies specification 6 and specification 7.
(3) Set the REW mode, and check that the RF waveform satisfies specification 6 and specification 7.

If specifications 6 and 7 are not satisfied, perform the adjustment in the Section 6-5-2 (Tape Entrance Side) or Section 6-5-3 (Tape Exit Side).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.6 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)



Spec.7 : Appears waveforms with no lacking.

Video Tracking Check (F.FWD, REW)

8. Check the ADVANCE Head Contact

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)

(2) Play back the alignment tape HR5-1A in the PLAY mode.

(3) Check that the RF envelope waveforms of ADV AC ENV and ADV BD ENV satisfy specification 8.

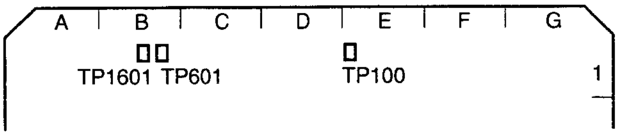
(4) Turn off the power, then remove the alignment tape.

- Connection of the oscilloscope

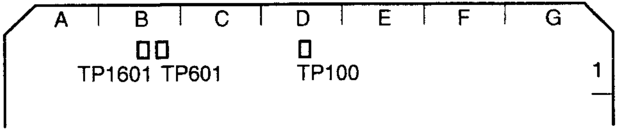
CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG: TP100/EQ-84 board (ADV AC SEL signal)

<EQ-84 board, side A>

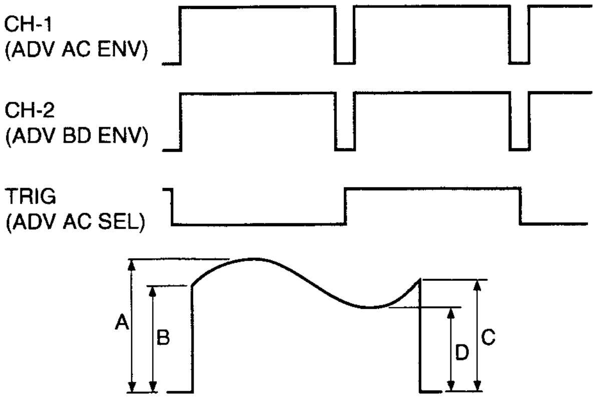
Board No.suffix 12



Board No.suffix 13 and higher



- Alignment tape : HR5-1A
S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.8 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 70\,\%$ $\frac{C}{A} \times 100 \geqq 70\,\%$ $\frac{D}{A} \times 100 \geqq 70\,\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

ADVANCE Head Contact Check

9. Check the Analog Betacam Y/C Head Contact

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)
Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(2) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(3) Set Bit-1, Bit-2 and Bit-3 of DIP switch S101 on the SS-89 board to ON (pushed up).

(4) Turn on the power, then play back CR2-1B/ CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(5) Rotate the tracking VR (RV300/SS-89) to maximize the level at the center of the RF envelope waveform.

(6) Check that the RF envelope waveform is output in each channel.
Check that the Ya and Ca RF envelope waveforms satisfy specification 9.

(7) Turn off the power, then remove CR2-1B/ CR2-1B PS.

(8) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

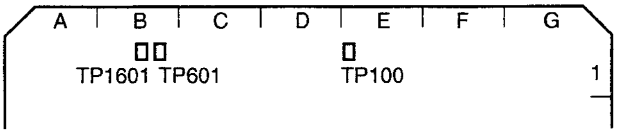
10. Function Menu Setting

Turn on the power, then return F1 (CAPSTN) of function menu Page 4 to the customer setting.

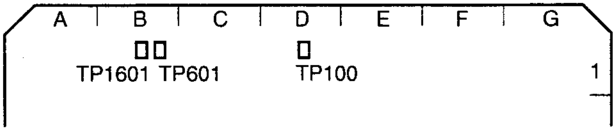
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

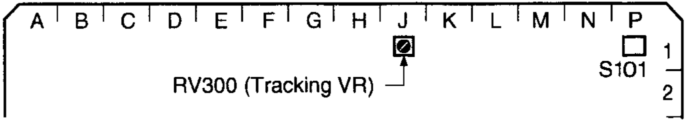
<EQ-84 board, side A>
Board No.suffix 12



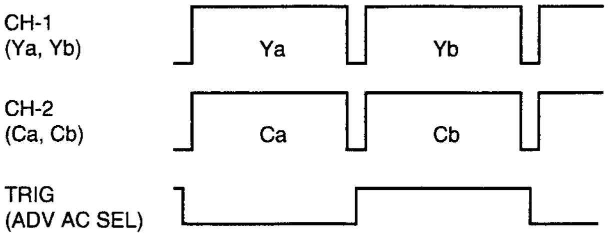
Board No.suffix 13 and higher

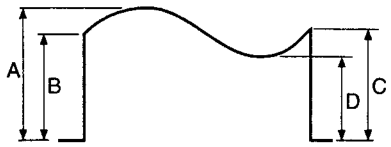


<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.12 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\%$ $\frac{C}{A} \times 100 \geqq 75\%$ $\frac{D}{A} \times 100 \geqq 75\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

Analog Betacam Y/C Head Contact Check

6-5-2. Tracking Adjustment at the Tape Entrance Side

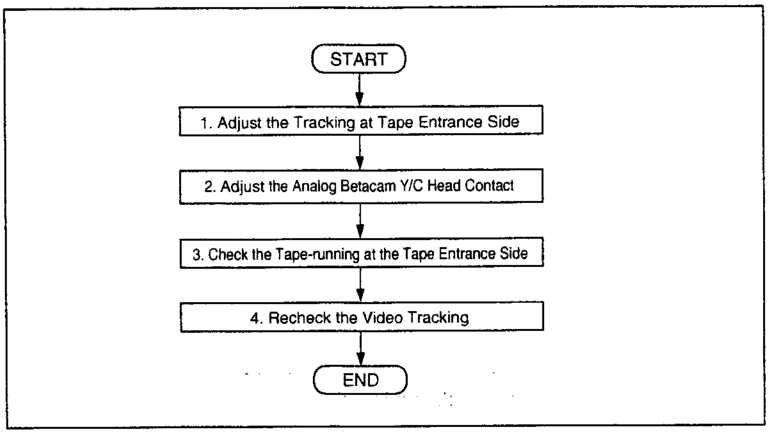
This adjustment should be performed when the specifications have not been satisfied in Section 6-5-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-5-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat to the entrance and exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the followings:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.


START
1. Adjust the Tracking at Tape Entrance Side
2. Adjust the Analog Betacam Y/C Head Contact
3. Check the Tape-running at the Tape Entrance Side
4. Recheck the Video Tracking
END

Flow Chart of Tracking Adjustment at the Tape Entrance Side

1. Adjust the Tracking at the Tape Entrance Side

(1) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(2) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level. (Fig. 1)

(4) Loosen the height adjustment nut of TG-2 so that the tape does not in contact the upper flange. (Fig. 2)

(5) Rotate the height adjustment nut of TG-1 to flatten the RF envelope waveform. (Fig. 1)

If the waveform does not become flat, perform the following adjustment (① to ③).

① Clean the lower drum lead with a wooden stick. (Refer to Section 4-2-4.)

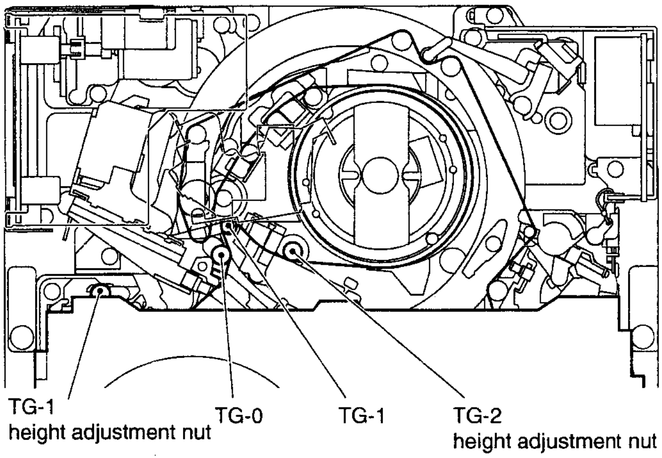
② While running the tape, press the tape lightly with the wooden stick and check that the tape does not float from the lead.

③ Adjust the height of TG-1 so that the RF envelope waveform becomes as flat as possible within the scope of Specification 10 in Fig. 3.

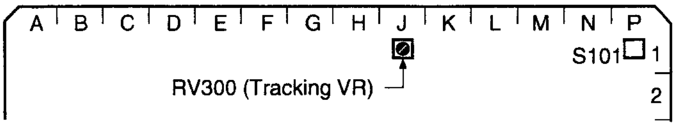
(6) Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 4)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

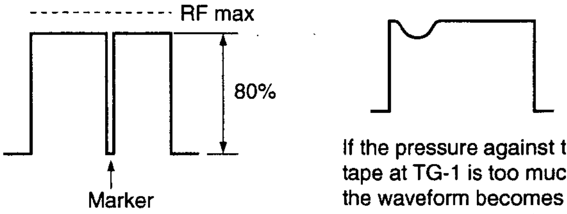

TG-1
height adjustment nut
TG-0
TG-1
TG-2
height adjustment nut

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
S101
1
2
RV300 (Tracking VR)

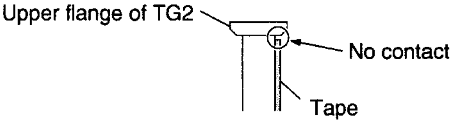
- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>

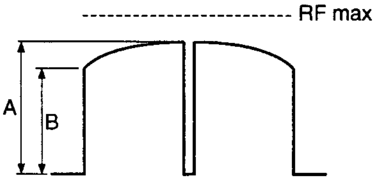

RF max
80%
Marker

If the pressure against the tape at TG-1 is too much, the waveform becomes as shown in the upper figure. (NG)

<Fig.2>


Upper flange of TG2
No contact
Tape

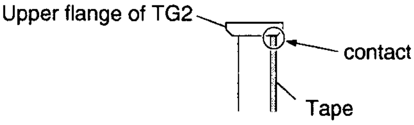
<Fig.3>



A = RF max × 0.8

Spec.10: $\frac{B}{A} \times 100 \geqq 70$ %

<Fig.4>


Upper flange of TG2
contact
Tape

Tracking Adjustment at Tape Entrance Side (PLAY)

2. Adjust the Analog Betacam Y/C Head Contact

(1) Turn off the power, then remove the alignment tape.

(2) Connect the oscilloscope as follows:

CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)

Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(3) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(4) Set Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(5) Turn on the power, then playback the CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(6) Turn the tracking VR (RV300/SS-89 board) so that the center portion of the RF envelope waveform becomes the maximum output level.

(7) Check that the RF envelope waveform is output in each channel. Check that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 11.

If specification 11 is not satisfied, perform step (12) and later.

(8) Turn off the power, then remove the alignment tape CR2-1B/CR2-1B PS.

(9) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

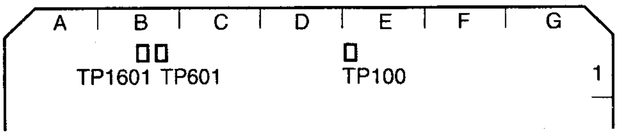
(10)Set the alignment tape HR2-1A and put the weight (approx. 1000 g) onto it.

(11)Turn on the power, then perform following step 3 and later.

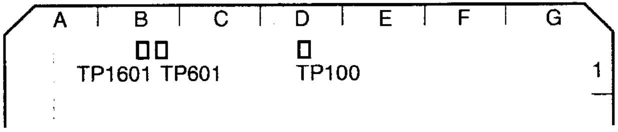
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

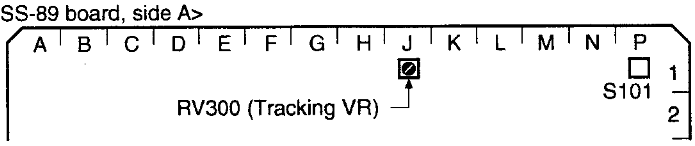
<EQ-84 board, side A>
Board No.suffix 12



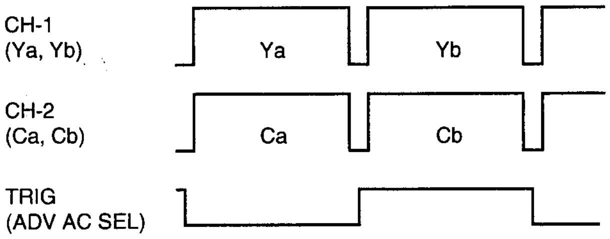
Board No.suffix 13 and higher

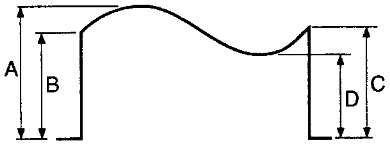


<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.12 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\ \%$ $\frac{C}{A} \times 100 \geqq 75\ \%$ $\frac{D}{A} \times 100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

(12)Loosen the height adjustment nut of TG-2 so that the tape does not touch the upper flange. (Fig. 5)

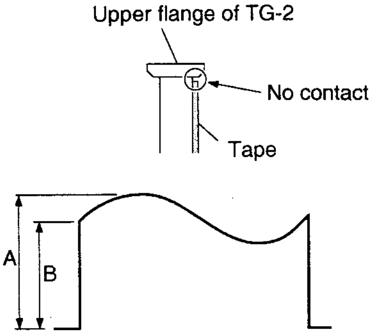
(13)Rotate the height adjustment nut of TG-1 and adjust so that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 12.

(14)Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 6)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

<Fig.5>

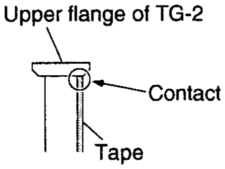


Spec.12 : The output of the entrance waveform must be 80 % of maximum value.

$\frac{B}{A} \times 100 = 80$ % (Not B/A x 100 > 80 %)

However if the outputs of the entrance waveform of the Ya RF envelope waveform and Ca RF envelope waveform are both not 80 % of the maximum value, adjust so that the RF envelope with the smaller entrance waveform output becomes 80 % of the maximum value.

<Fig.6>



Analog Betacam Y/C Head Contact Adjustment

(15)Turn off the power, then remove the CR2-1B/CR2-1B PS.

(16)Reset Bit-2 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(17)Connect the oscilloscope as follows:

CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP100/EQ-84 board
(ADV AC SEL signal)
TRIG: TP303/SS-89 board
(CF4 signal)

(18)Change the oscilloscope setting as follows:

CH1: 500 mV to 1V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

(19)Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.

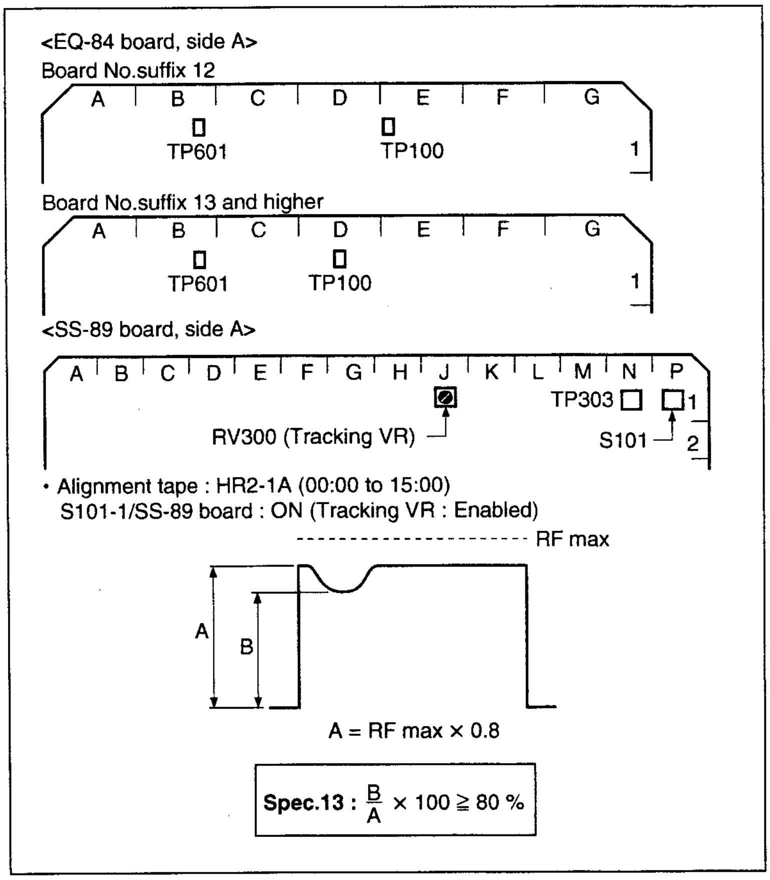
(20)Turn on the power, then play back the alignment tape (00:00 to 15:00) in the PLAY mode.

(21)Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(22)Check that the levels A and B shown in the figure satisfy specification 13.

(23)Reset Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

If specification 13 is not satisfied, perform the adjustment from (3) of step 1 and later again.


<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP601
TP100
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP601
TP100
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
TP303
1
RV300 (Tracking VR)
S101
2
RF max
A
B

• Alignment tape : HR2-1A (00:00 to 15:00)
S101-1/SS-89 board : ON (Tracking VR : Enabled)

A = RF max × 0.8

Spec.13 : $\frac{B}{A} \times 100 \geqq 80\ \%$

Tracking Adjustment

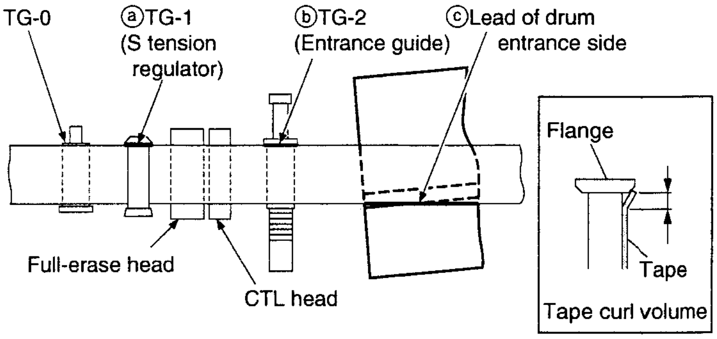
3. Check the Tape-running at the Tape Entrance Side

(1) Check the tape-running at the tape entrance side in each of the following modes:
- PLAY mode
- F.FWD mode

If the curl of any of the tape guides does not satisfy specification 14, perform the adjustment from (3) of step 1 and later again.

(2) Check the tape-running at the tape entrance in each of the following modes:
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the curl of any of the tape guides does not satisfy specification 15, perform the adjustment from (3) of step 1 and later again.



Spec.14 : ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.15 : ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at the Tape Entrance Side

4. Recheck the Video Tracking

Perform steps from 3 to 11 in Section 6-5-1.

Note

After adjusting, be sure to reset Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-5-3. Tracking Adjustment at the Tape Exit Side

This adjustment should be performed when the specifications have not been satisfied in Section 6-5-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-5-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the following:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.

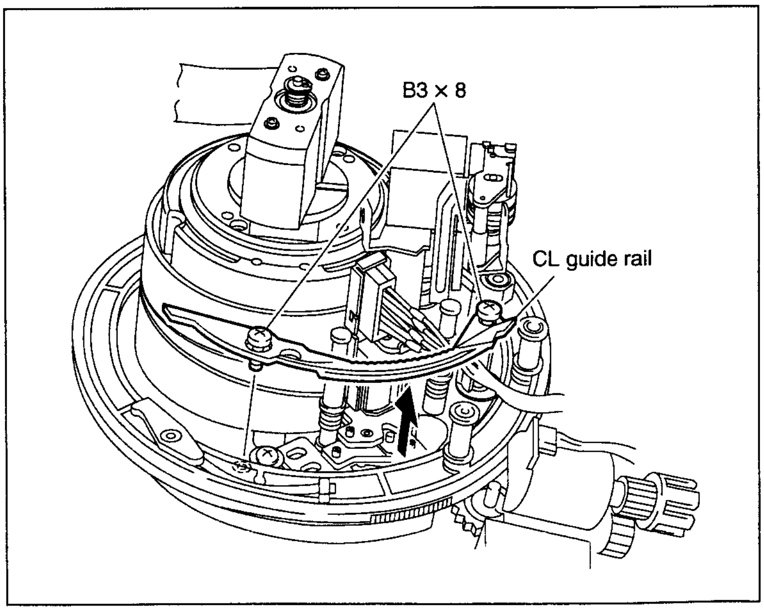
1. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws to remove the CL guide rail.

Note

Do not pull out the screws because the screw holes on the CL guide rail are shaped in such a way to prevent screws from falling.



CL Guide Rail Removal

2. Adjust the Tracking at the Tape Exit Side

(1) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(2) Turn on the power, then play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) to set the center of the RF envelope waveform to the maximum output level.

(4) Turn the height adjustment nut of TG-3 counterclockwise by one to two turns so that the tape does not in contact with the upper flange of TG-3.

Note

Don't turn excessively the nut, or the tape bottom edge does in contact with the lower flange of TG-3.

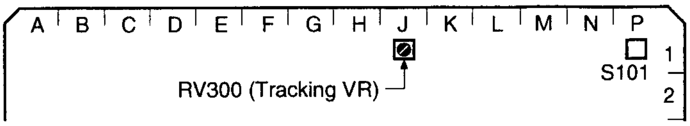
(5) Turn the height adjustment nut of TG-4 clockwise so that the tape does not in contact with the lower flange of TG-4.

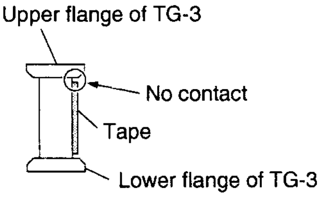
(6) Check that the RF envelope waveform satisfies the specification 16. (Fig. 1)
If satisfied, perform the step (8) and later.
If not, perform the step (7) and later.

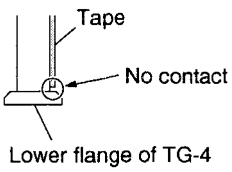
(7) Turn the zenith adjustment screw of the AT head so that the right portion of the RF envelope waveform makes 60 % or less of the maximum output level. (specification 16)
At this time, check that the tape does not in contact with both upper flange of TG-3 and lower flange of TG-4.
If the tape contacts either flange, repeat step (4) or (5).
If the tape moves upward or downward following the guide flange movement, perform the following adjustment.
This trouble cause is uneven tape tension at upside or downside of the tape caused by AT head zenith.

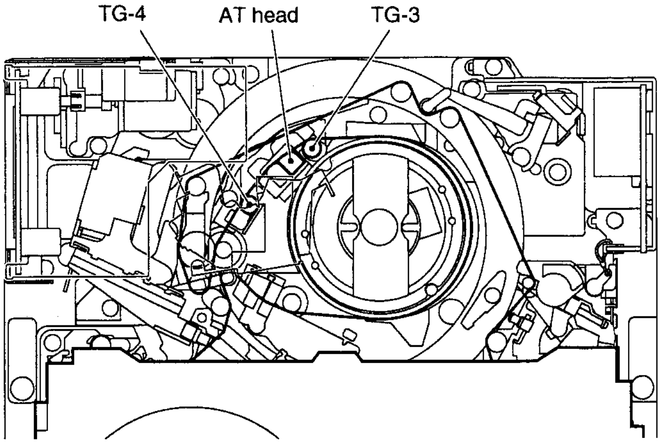
- If the tape moves upward at TG-3:
  Turn the zenith adjustment screw counterclockwise.
- If the tape moves downward at TG-4:
  Turn the zenith adjustment screw clockwise.

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300 (Tracking VR)
S101
1
2

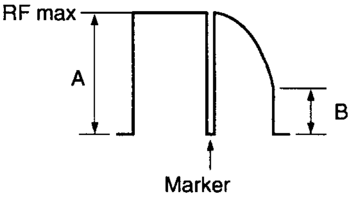

Upper flange of TG-3
No contact
Tape
Lower flange of TG-3


Tape
No contact
Lower flange of TG-4

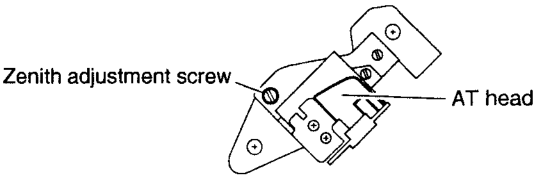

TG-4
AT head
TG-3

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>


RF max
A
B
Marker

Spec.16 : $\frac{B}{A} \times 100 = 30 \pm 30$ %


Zenith adjustment screw
AT head

(8) Turn the height adjustment nut of TG-3 clockwise so that the tape is in contact with the upper flange and the RF envelope waveform becomes flat. (Fig. 2)
Simultaneously, ensure that the tape does not in contact with the lower flange of TG-4.

If the waveform does not become flat, perform the steps ① to ③ (check and adjustment) below:

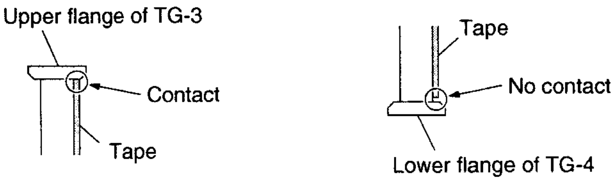
① Clean the drum lead with a wooden stick. (Refer to Section 4-2-4.)

② Press down the tape by wooden stick very lightly and check to see that the tape is running without aparting from the drum lead.

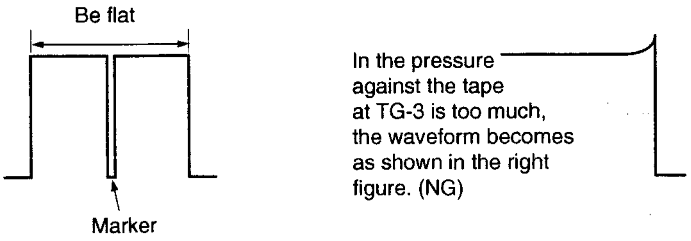
③ If the waveform does not become flat even after performing steps ① and ②, adjust the height of TG-3 so that the RF envelope waveform is nearly flat within the range of the specification 17 shown in the Fig.3. At this time, do not overpress the tape at TG-3.

Note

After adjusting the height of TG-3 in step ③ above, be sure to check the height of AT head (Refer to Section 6-5-6). If the AT head height does not satisfy the specification, repeat the video tracking adjustment.

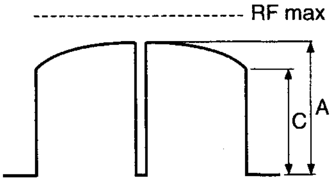


<Fig.2>



In the pressure against the tape at TG-3 is too much, the waveform becomes as shown in the right figure. (NG)

<Fig.3>



A = RF max × 0.8

Spec.17 : $\frac{C}{A} \times 100 \geqq 70$ %

(9) Adjust the height of TG-4 so that the lower flange of TG-4 in contact with the tape.

(10)Check the tape-running at the tape exit side in the following modes:

- PLAY mode
- F. FWD mode
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the tape curl at TG-3 does not satisfy the specification 18, perform the steps ① and ② (adjustment) below.

① Change the zenith of the AT head within the range of the specification 16.
(Refer to previous step (7).)

② Perform the tracking adjustment again.
(Refer to previous steps (2) through (10).)

(11)If the AT head zenith was changed in above ①, perform the checks and adjustments described below:

- AT head height (Refer to Section 6-5-6.)
- AT head azimuth (Refer to Section 6-5-7.)
- AT head head-to-tape contact (Refer to Section 6-5-8.)
- AT head position (Refer to Section 6-5-9.)

3. Attach the CL Guide Rail

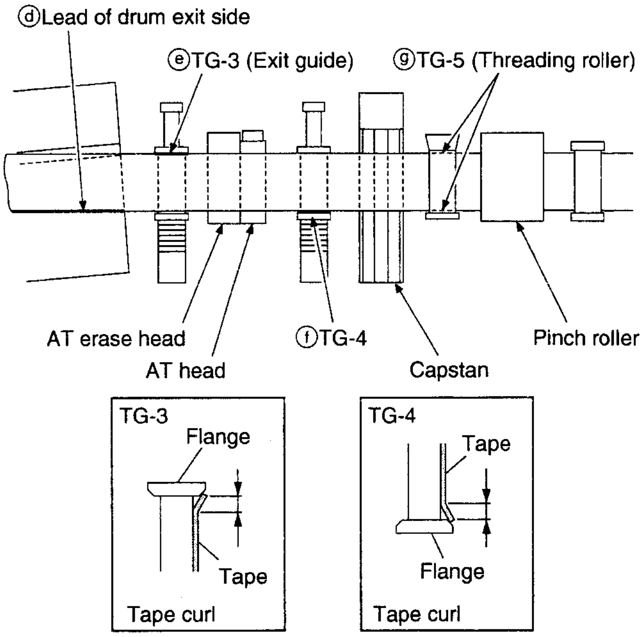
Turn off the power, then attach the CL guide rail.

4. Recheck the Video Tracking

Perform the steps 4 through 10 in Section 6-5-1 again.

Note

After adjustment, be sure to reset Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).



Spec.18 : ⓓ Lead of drum exit side
The tape runs without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5 (Threading roller)
The tape runs without any curl at the upper and lower flanges.

Tracking Adjustment at the Tape Exit Side

6-5-4. CTL Head Height Check and Adjustment

Tools

- Alignment tape HR2-1A: 8-960-076-11
- Oscilloscope (Tektronix TDS460A or equivalent)
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

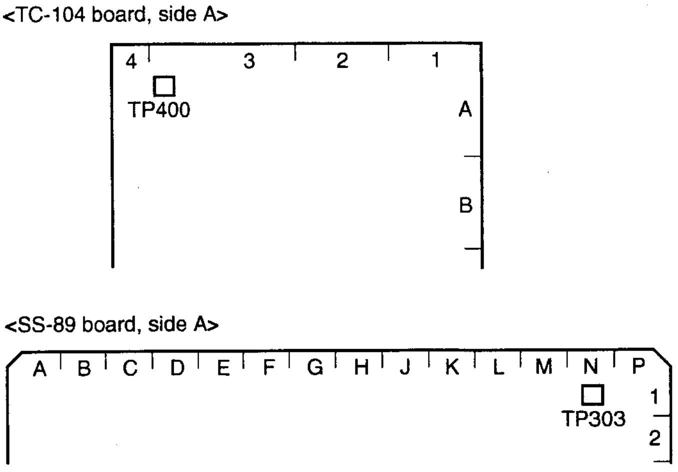
(1) Turn off the power.
(2) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
TRIG : TP303/SS-89 board (CF4 signal)



Preparation

Check

3. Check the CTL Head Height

Note

Never rotate the screw of portion C shown in the figure, or that might cause malfunctioning of tape running and head performance.

(1) Play back the alignment tape HR2-1A (15:00 to 25:00) in the PLAY mode.

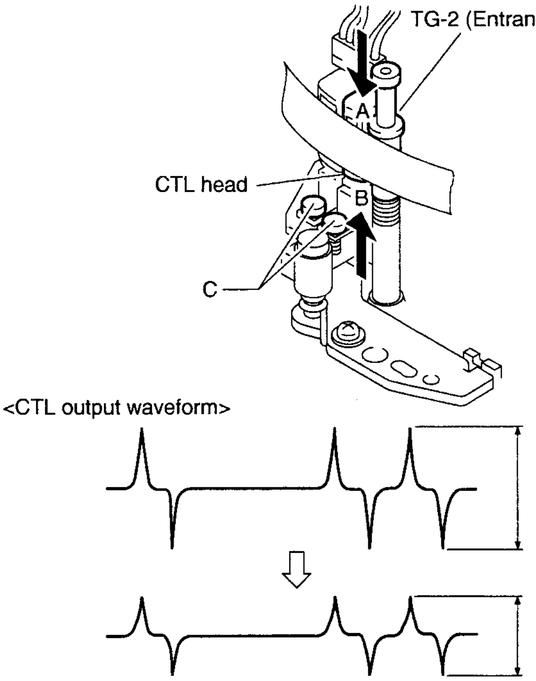
(2) Press down the portion A of the tape shown in figure, and then check to see that the level decreases by pressing the tape.

If the level increases, perform step 4-Ⓐ.

(3) Push up the portion B of the tape, and then check to see that the level decreases by pushing the tape.

If the level increases, perform step 4-Ⓑ.

• Alignment tape : HR2-1A (15:00 to 25:00)



Spec. : The level decreases when pressing down and when pushing up the alignment tape.

CTL Head Height Check

Adjustment

4. CTL Head Height Adjustment

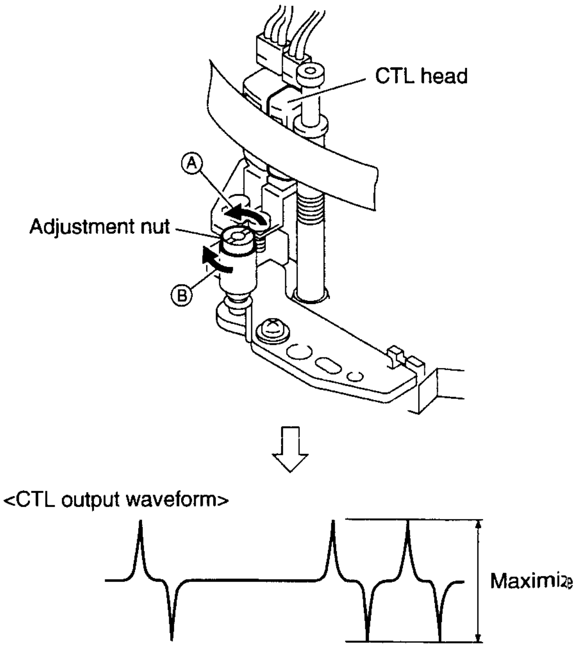
Ⓐ When the Level Increased by Pressing Down the Tape

Turn the adjustment nut counterclockwise (in the arrow Ⓐ direction) so that the output waveform is maximum.

Ⓑ When the Level Increases by Pushing Up the Tape

Turn the adjustment nut clockwise (in the arrow Ⓑ direction) so that the output waveform is maximum.

• Alignment tape : HR2-1A (15:00 to 25:00)



CTL Head Height Adjustment

6-5-5. CTL Head Position Check and Adjustment

Precaution

The CTL head position adjustment is closely related to the AT head position adjustment.
Be sure to confirm the AT head position after adjusting the CTL head position.

Tools

• Alignment tape HR2-1A:	8-960-076-11
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape HR2-1A and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

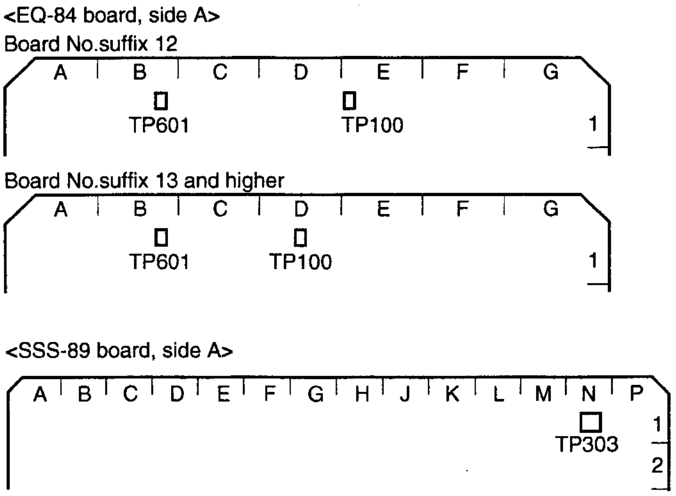
Connect the oscilloscope as follows:

CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP100/EQ-84 board (ADV AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

Oscilloscope setting:
CH-1: 500 mV to 1 V/DIV
TRIG: 5 V/DIV
TIME: 2 ms/DIV

- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP100/EQ-84 board (ADV AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)


<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP601
TP100
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP601
TP100
1
<SSS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
TP303
1
2

Preparation

Check

3. Check the CTL Head Position

(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker shown in the figure is appeared following the positive slope of the CF4 signal. (Specification 1)

Note

The RF envelope waveform is recorded on HR2-1A (00:00 to 15:00) only for A ch.

(3) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

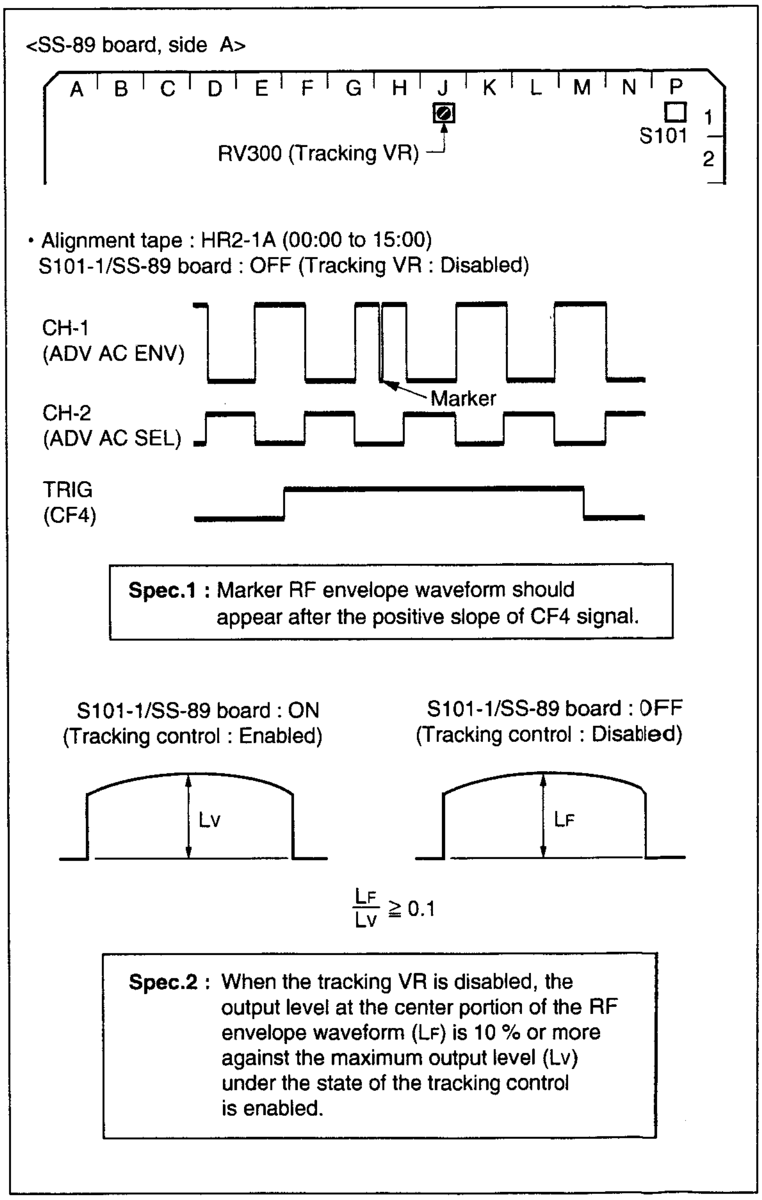
(4) Rotate the tracking VR (RV300/SS-89 board) until the output level at the center of the RF envelope with the marker confirmed in step (2) becomes maximum, and read the level (Lv) at that time.

(5) Set Bit-1 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(6) Read the output level (LF) at the center of the RF envelope waveform.

(7) Check that the level (Lv) read at step (4) and the level (LF) read at step (6) satisfy specification 2.

If they are without the specification, perform following step 4 and later.


<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
RV300 (Tracking VR)
S101
1
2
CH-1
(ADV AC ENV)
Marker
CH-2
(ADV AC SEL)
TRIG
(CF4)
S101-1/SS-89 board : ON
(Tracking control : Enabled)
S101-1/SS-89 board : OFF
(Tracking control : Disabled)
Lv
LF

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

Spec.1 : Marker RF envelope waveform should appear after the positive slope of CF4 signal.

$$\frac{L_F}{L_V} \geqq 0.1$$

Spec.2 : When the tracking VR is disabled, the output level at the center portion of the RF envelope waveform (LF) is 10 % or more against the maximum output level (Lv) under the state of the tracking control is enabled.

CTL Head Position Check

Adjustment

Note

Ensure that the tracking control is disabled (S101-1/SS-89 board ⇨ OFF) before following adjustment.

4. Adjust the CTL Head Position

(1) Loosen the securing screw of the CTL head assembly by 1/4 to 1/2 turn.

(2) Insert a 3 mm flatbladed screwdriver into the notch of the CTL head assembly.

(3) Adjust the CTL head assembly position so that the output level at the center portion is maximum and the marker appears in the RF envelope waveform following the positive slope of the CF4 signal. (Specification 3)

Note

The RF envelope waveform is recorded on HR2-1A (00:00 to 15:00) only for A ch.

(4) Tighten the screw loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf • cm}

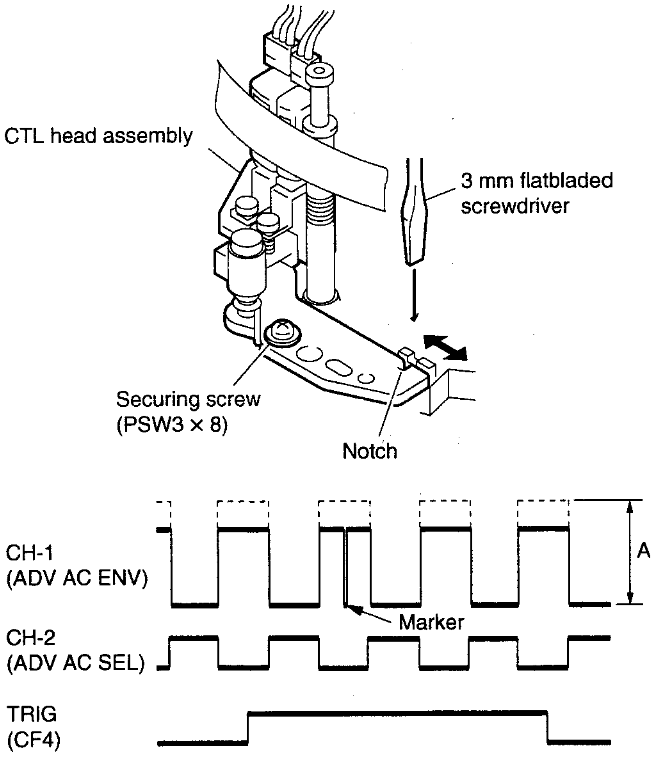
5. Recheck the CTL Head Position

Perform step 3 again.

Note

After adjustment, be sure to reset Bit-1 and Bit-3 of the Dip switch S101 on the SS-89 board to OFF (pushed down).

- Alignment tape : HR2-1A (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.3 : Make the portion A to the maximum level.

CTL Head Position Adjustment

After the Adjustment

6. Adjust Drum Phase

Refer to Section 7-2-3.

7. Adjust Digital DT System

Refer to Section 7-2-5.

8. Adjust Analog DT System

Refer to Section 7-2-8.

9. Adjust the AT Head Position

Refer to Section 6-5-9.

6-5-6. AT Head Height Check and Adjustment

Precaution

The AT head height adjustment is closely related to the azimuth adjustment, head-to-tape contact adjustment, and head position adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head height.

Tools

- Alignment tape

For HDW-M2100:	CR8-1A:	8-960-097-45
For HDW-M2100P:	CR8-1A PS:	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

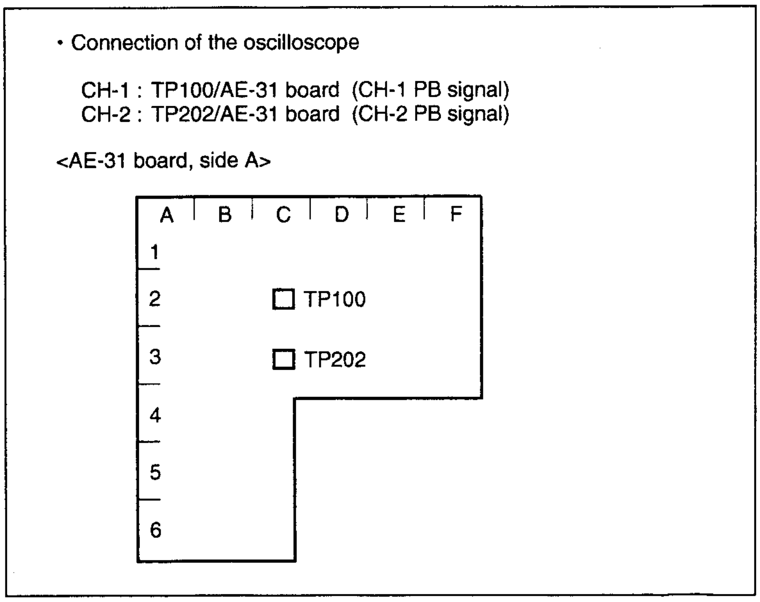
Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV



- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>

Preparation

Check

3. Check the AT Head Height

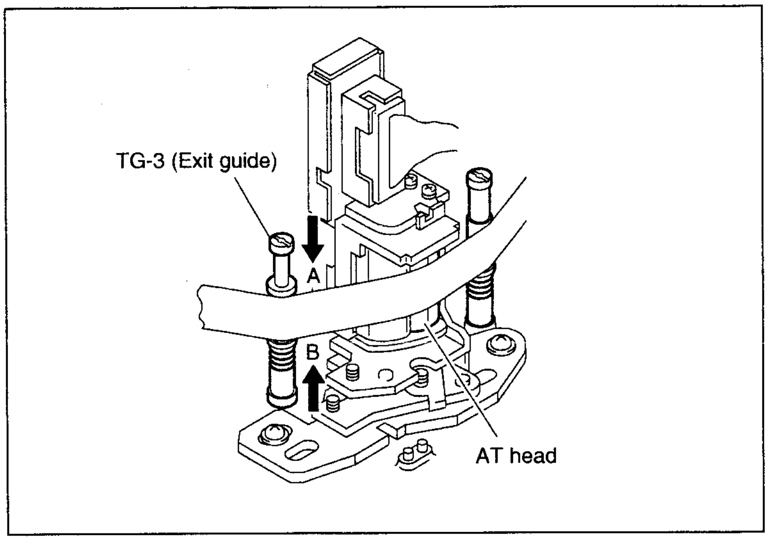
(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly press down the portion A of the tape shown in the figure, and check to see that both levels in CH-1 and CH-2 decrease by pressing the tape.

If both levels increase, perform step 4-Ⓐ.

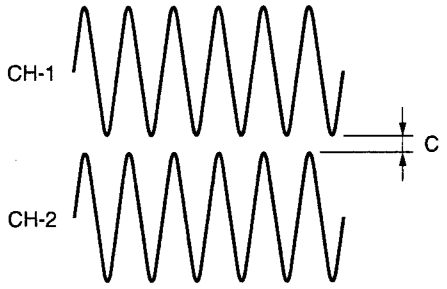
(3) Slightly push up the portion B of the tape, and check to see that both levels in CH-1 and CH-2 decrease by pushing the tape.

If both levels increase, perform step 4-Ⓑ of next page.



AT Head Height Check

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec. : The portion C widens when pressing down and when pushing up the alignment tape.

Specification

Adjustment

4. AT Head Height Adjustment

Ⓐ When both Levels Increase by Pressing Down the Tape

Turn the height adjustment screw clockwise so that both output level are maximum. (Fig. 1)
(Make the portion C minimize.)

Ⓑ When both Levels Increase by Pushing Up the Tape

(1) Turn the height adjustment screw counterclockwise to maximize both output levels from in CH-1 and CH-2. Turn the height adjustment screw counterclockwise furthermore to decrease the output level slightly. (Arrow ① in Fig. 2)

(2) Turn the height adjustment screw clockwise and adjust so that both output levels are maximum. (Arrow ② in Fig. 2)
(Make the portion C minimize.)

Note

To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved upward (with the height adjustment screw turned clockwise).

After the Adjustment

5. Adjust the AT Head Azimuth

Refer to Section 6-5-7.

6. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-5-8.

7. Adjust the AT Head Position

Refer to Section 6-5-9.

8. Recheck the AT Head Height

Refer to step 3 in this section.

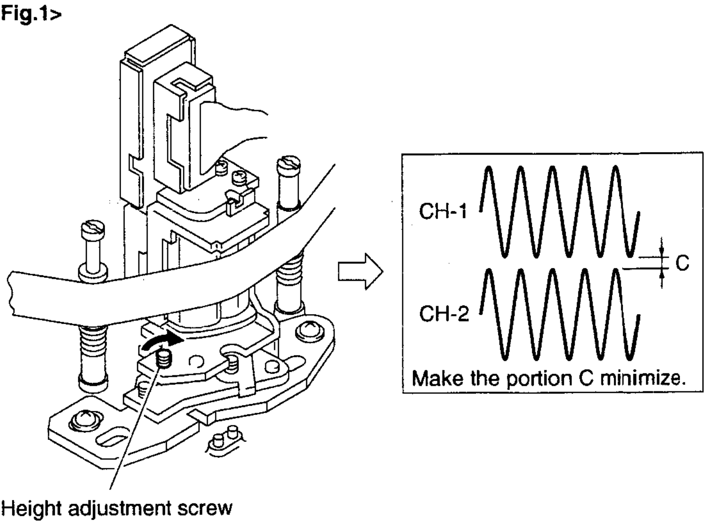
9. Recheck the AT Head

Perform the steps 5 through 7 again.

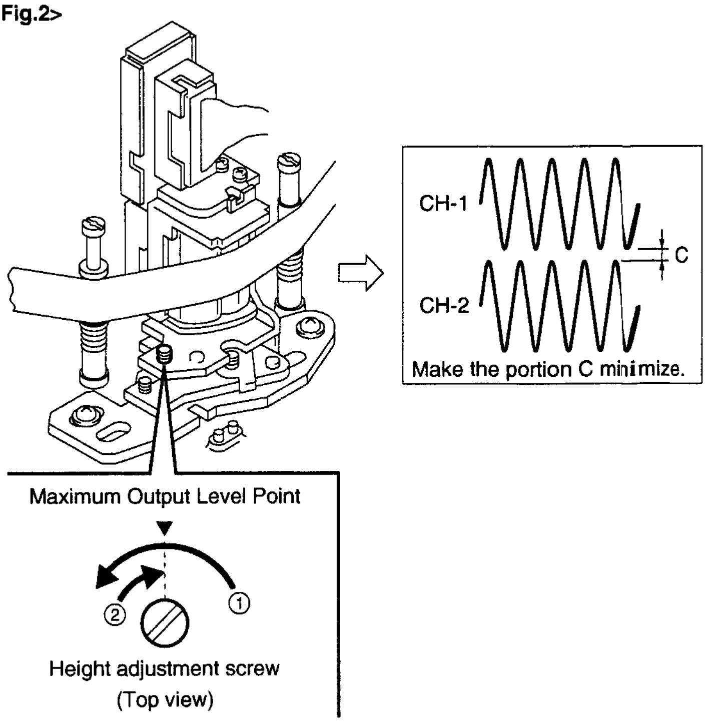
10. Apply the Locking Compound

Refer to Section 6-1-9.

<Fig.1>


CH-1
CH-2
C
Make the portion C minimize.
Height adjustment screw

<Fig.2>


CH-1
CH-2
C
Make the portion C minimize.
Maximum Output Level Point
②
①
Height adjustment screw
(Top view)

AT Head Height Adjustment

6-5-7. AT Head Azimuth Check and Adjustment

Precaution

The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.

Tools

- Alignment tape

For HDW-M2100:	CR8-1A	8-960-097-45
For HDW-M2100P:	CR8-1A PS:	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

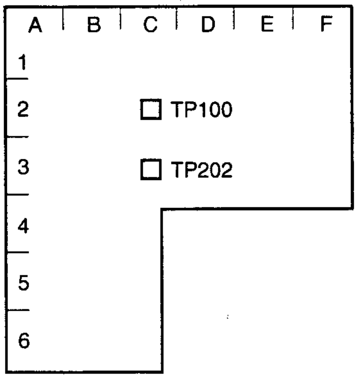
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 100 mV/DIV
CH-2: 100 mV/DIV
MODE: X-Y

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Azimuth

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Adjust the horizontal and vertical amplitudes of lissajous waveform displayed on the oscilloscope to six cm each.

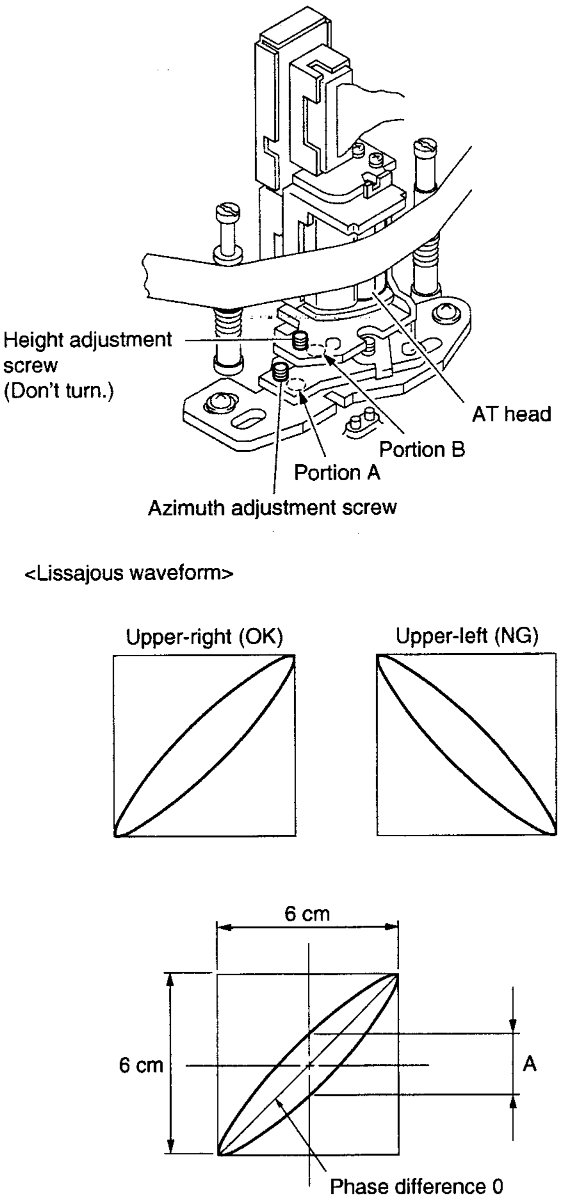
(3) Check that the lissajous waveform holds the upper-right shape.

(4) Check that the vertical amplitude at the center point in the horizontal direction satisfies the specification.

If the specification in figure is not satisfied, perform following steps 4 and later.

(5) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

- Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : A ≦ 0.52 cm

AT Head Azimuth Adjustment

Adjustment

4. Adjust the AT Head Azimuth

(1) Turn the azimuth adjustment screw so that the specification is satisfied.

(2) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

After the Adjustment

5. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-5-8.

6. Adjust the AT Head Position

Refer to Section 6-5-9.

7. Check the AT Head Height

Refer to Section 6-5-6.

8. Check the AT Head Azimuth

Refer to step 3 in this section.

9. Recheck the AT head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-5-8. AT Head Head-to-tape Contact Check and Adjustment

Precaution

The AT head head-to-tape contact adjustment is closely related to the head position adjustment, head height adjustment, and head azimuth adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head head-to-tape contact.

Tools

• Alignment tape	
For HDW-M2100: CR8-1A:	8-960-097-45
For HDW-M2100P: CR8-1A PS:	8-960-098-45
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

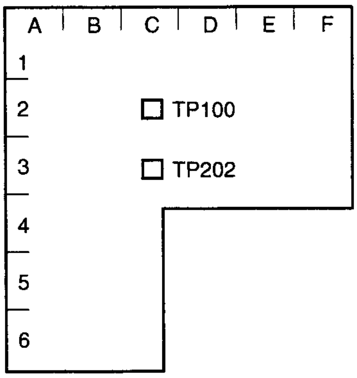
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

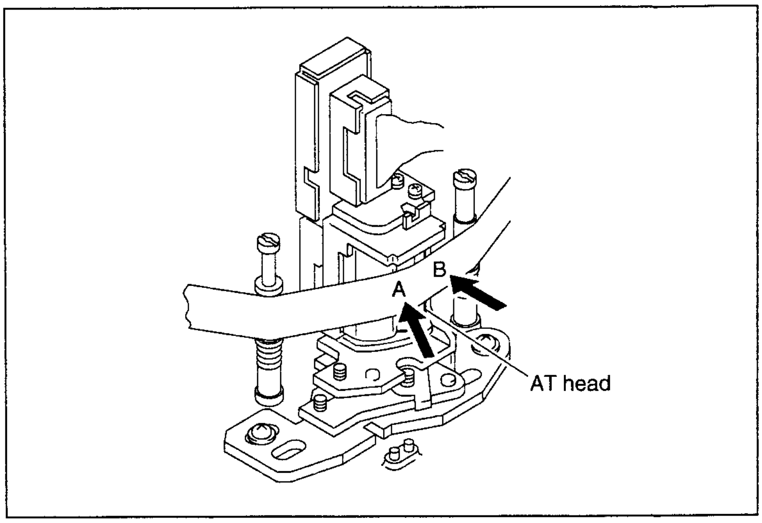
3. Check the AT Head Head-to-tape Contact

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

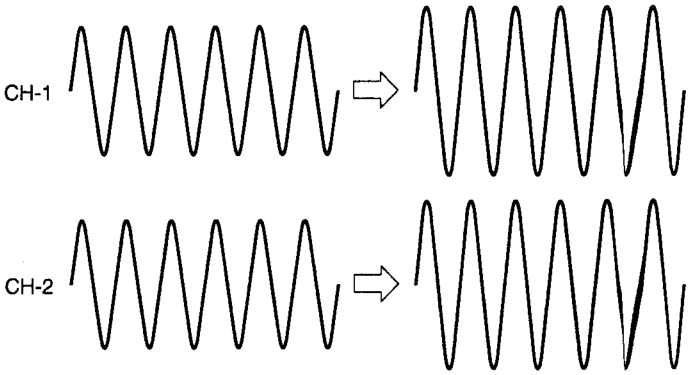
(3) Check that both increased amount of the output levels in CH-1 and CH-2 satisfy the specification.

If the specification is not satisfied, perform following steps 4 and later.



AT Head Head-to-tape Contact Check

• Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : Both increased amount of the output levels in CH-1 and CH-2 are within 5 %.

Specification

Adjustment

4. Adjust the AT Head Head-to-tape Contact

(1) Loosen the two head securing screws by 1/4 to 1/2 turn.
(2) Insert a 2 mm flatbladed screwdriver into the notch of the adjustment plate.
(3) Adjust the AT head position to maximize the output level.
(4) Tighten the two securing screws loosened in step (1).

Tightening torque: 19.6×10^{-2} N•m
{2 kgf•cm}

5. Recheck the AT Head Head-to-tape Contact

Perform to previous step 3 in this section again.

After the adjustment

6. Check the AT Head Position

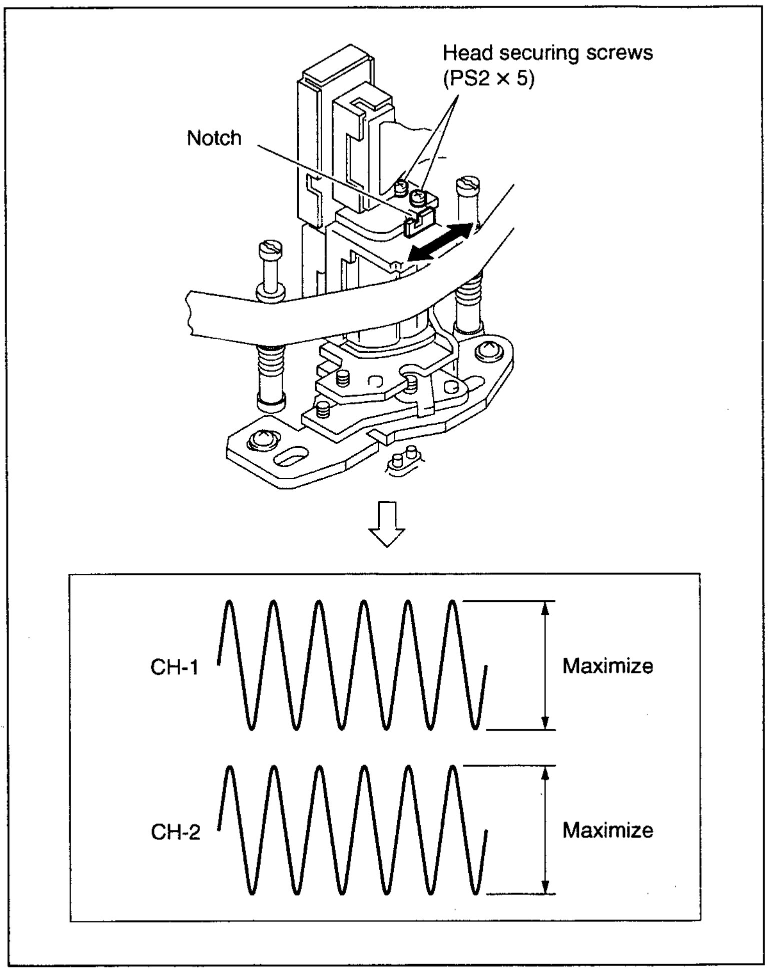
Refer to Section 6-5-9.

7. Check the AT Head Height

Refer to Section 6-5-6.

8. Check the AT Head Azimuth

Refer to Section 6-5-7.



AT Head Head-to-tape Contact Adjustment

6-5-9. AT Head Position Check and Adjustment

Precautions

- The CTL head position adjustment should be completed before performing this adjustment. The AT head position is adjusted relative to the CTL head position as reference.
- The AT head position adjustment is closely related to the head height adjustment, head azimuth adjustment, and head-to-tape contact adjustment. Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head position.

Tools

• Alignment tape HR2-1A:	8-960-076-11
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape HR2-1A, and put a weight (about 1000 g) onto it.

(3) Turn on the power.

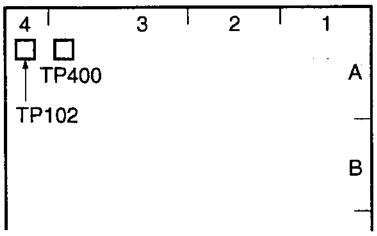
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
CH-2: TP102/TC104 board (TC PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
CH-2: 2 V/DIV
TIME: 10 ms to 500 µs/DIV

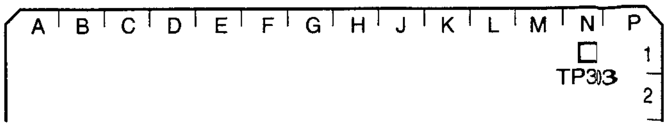
- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

<TC-104 board, side A>



<SS-89 board, side A>



Preparation

Check

3. Check the AT Head Position

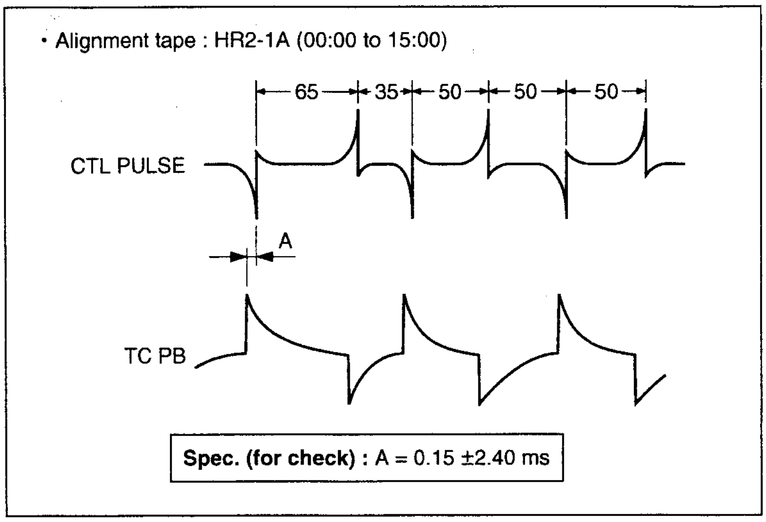
(1) Play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(2) Check that the positional relationship between the rising edges of CTL's 65:35 pulse and TC PB's 65:35 waveform signals satisfies the specification.

If the specification is not satisfied, perform following steps 4 and later.

Note

The TC signal is in 0.15 ms advance of the CTL signal.



- Alignment tape : HR2-1A (00:00 to 15:00)

Spec. (for check) : A = 0.15 ±2.40 ms

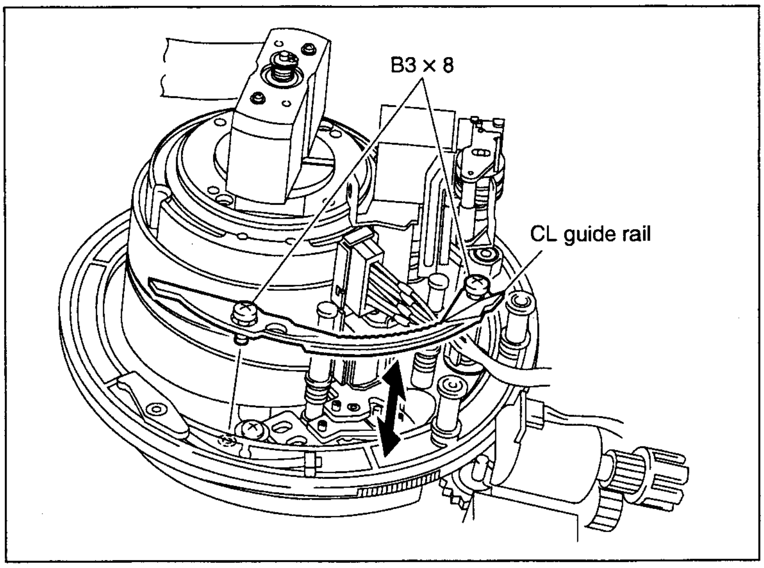
AT Head Position Check

Adjustment

4. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws, then remove the CL guide rail.



CL Guide Rail Removal/Reattachment

5. Adjust the AT Head Position

(1) Loosen the two securing screws of the AT head assembly by 1/4 to 1/2 turn.

(2) Turn on the power, then play back the alignment tape HR2-1A (00:00 to 15:00) in the PLAY mode.

(3) Insert a 3 mm flatbladed screwdriver into the notch of the AT head assembly.

(4) Adjust the AT head assembly position so that the specification is satisfied.

Notes

- The specifications in AT head position check and position adjustment differ. When adjusting, apply the specification in AT head position adjustment.
- The TC signal is in 0.15 ms advance of the CTL signal.

(5) Tighten the two screws loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf•cm}

6. Recheck the AT Head Position

Perform previous step 3 in this section again.

7. Attach the CL Guide Rail

(1) Turn off the power, then remove the alignment tape.

(2) Attach the CL guide rail with two screws.

After the Adjustment

8. Check the AT Head Height

Refer to Section 6-5-6.

9. Check the AT Head Azimuth

Refer to Section 6-5-7.

10. Check the AT Head Head-to-tape Contact

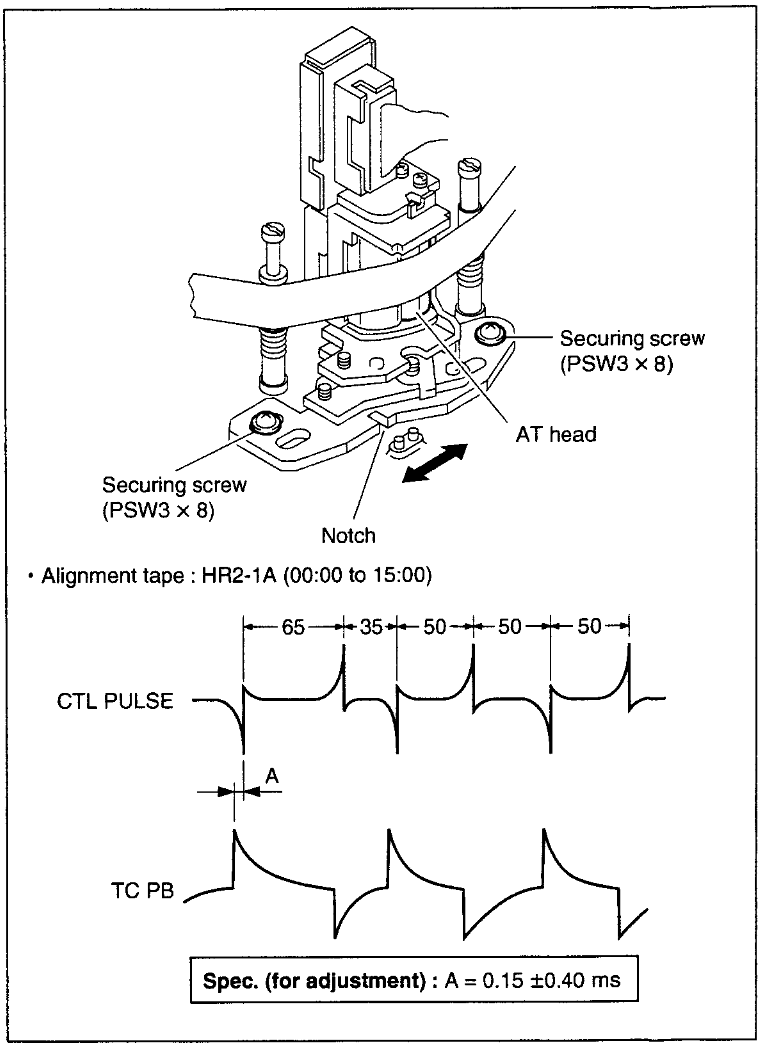
Refer to Section 6-5-8.

11. Check the AT Head Position

Refer to step 3 in this section.

12. Apply the Locking Compound

Refer to Section 6-1-9.



• Alignment tape : HR2-1A (00:00 to 15:00)

Spec. (for adjustment) : A = 0.15 ±0.40 ms

AT Head Position Adjustment

6-5-10. Audio Level Check and Adjustment in REV Mode

Tools

- Alignment tape

For HDW-M2100: CR8-1A:	8-960-097-45
For HDW-M2100P: CR8-1A PS:	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape CR8-1A/CR8-1A PS and put a weight (about 1000 g) onto it.

(3) Turn on the power.

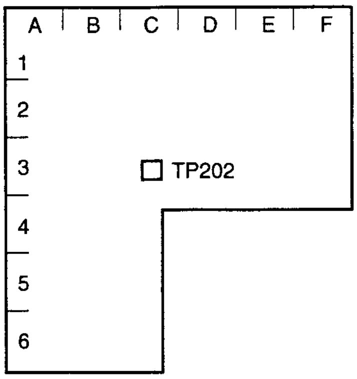
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

• Connection of the oscilloscope

CH-1 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the Audio Output Level

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS.

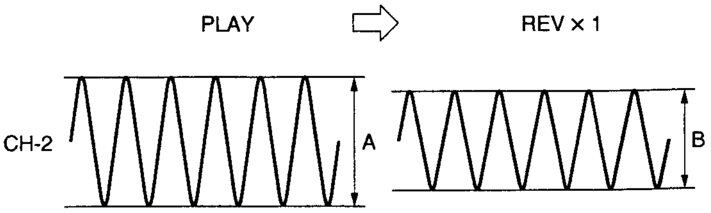
(2) Check the audio output level A in CH-2.

(3) Set the REV × 1 mode.

(4) Check that the audio output level B in CH-2 satisfies specification 1.

If specification 1 is not satisfied, perform following steps 4 and later.

• Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)



Spec.1 : $\frac{B}{A} \times 100 \geqq 90\ \%$

Audio Level Check in REV Mode

Adjustment

4. Adjust the TG-5 (Threading Roller) Height

(1) Play back the 1 kHz, 0 VU signal portion on the alignment tape CR8-1A/CR8-1A PS (8:00 to 10:00).

(2) Set the REV × 1 mode.

(3) Slightly press down the portion A of the tape shown in figure, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 clockwise using a tape guide adjustment driver.

(4) Slightly push up the portion B of the tape, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 counterclockwise using the tape guide adjustment driver.

(5) Check the output level satisfies specification 1 (previous page). Refer to previous step 3.

If the specification 1 is not satisfied, repeat steps (1) through (4) mentioned above.

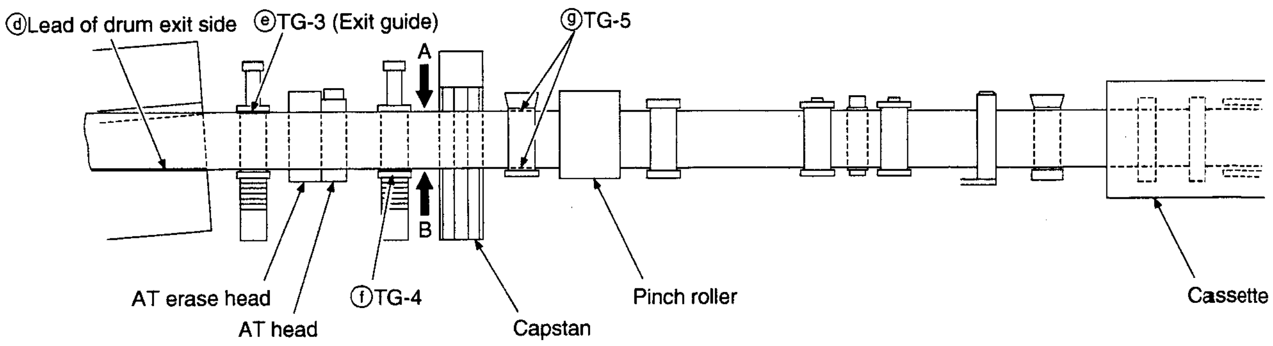
5. Check the Tape-running at Tape Exit Side

In the following modes, check that the tape-running condition satisfies specification 2.

- PLAY mode
- REV × 1 mode

If specification 2 is not satisfied, adjust the tape guides height at the tape exit side. (Refer to step 7 (at the Tape Exit Side) in Section 6-7-2.)

If the height of the tape guide is adjusted, perform the video tracking check.
(Refer to Section 6-5-1.)

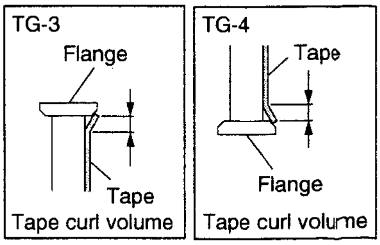


Spec.2 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5
The tape runs without any curl at the upper and lower flanges.



Audio Level Adjustment in REV Mode

6-6. DVW Recorder Tape Path

Applicable models: DVW-2000/P, M2000/P

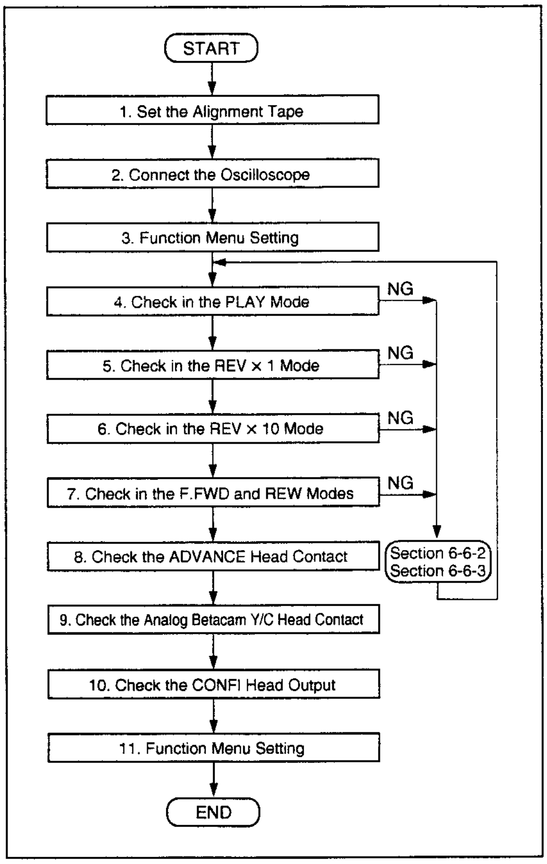
6-6-1. Video Tracking Check

Tools

- Alignment tapes

Type	Part No.	DVW-2000	M2000	2000P	M2000P
ZR2-1	8-960-073-11	O	O	—	—
ZR5-1	8-960-073-01	O	O	—	—
CR2-1B	8-960-096-01	—	O	—	—
ZR2-1P	8-960-073-61	—	—	O	O
ZR5-1P	8-960-073-51	—	—	O	O
CR2-1B PS	8-960-096-51	—	—	—	O

- Recording tape (S cassette): BCT-D32
- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment screwdriver (MW-261): J-6322-610-A


START
1. Set the Alignment Tape
2. Connect the Oscilloscope
3. Function Menu Setting
4. Check in the PLAY Mode
NG
5. Check in the REV x 1 Mode
NG
6. Check in the REV x 10 Mode
NG
7. Check in the F.FWD and REW Modes
NG
8. Check the ADVANCE Head Contact
Section 6-6-2
Section 6-6-3
9. Check the Analog Betacam Y/C Head Contact
10. Check the CONFI Head Output
11. Function Menu Setting
END

Video Tracking Check/Adjustment Flow Chart

Note

When checking video tracking, the RF envelope waveform (PLAY mode) should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments only when without the specifications.

Setting

1. Set the Alignment Tape

(1) Press the switch S300 on the SS-89 board during power-on to set the reel tables to the S cassette position.

(2) Turn off the power.

(3) Set the alignment tape ZR2-1 (for NTSC models) or ZR2-1P (for PAL models) and put a weight (about 1000 g) onto it.

2. Connect the Oscilloscope

- Connect the oscilloscope as follows:

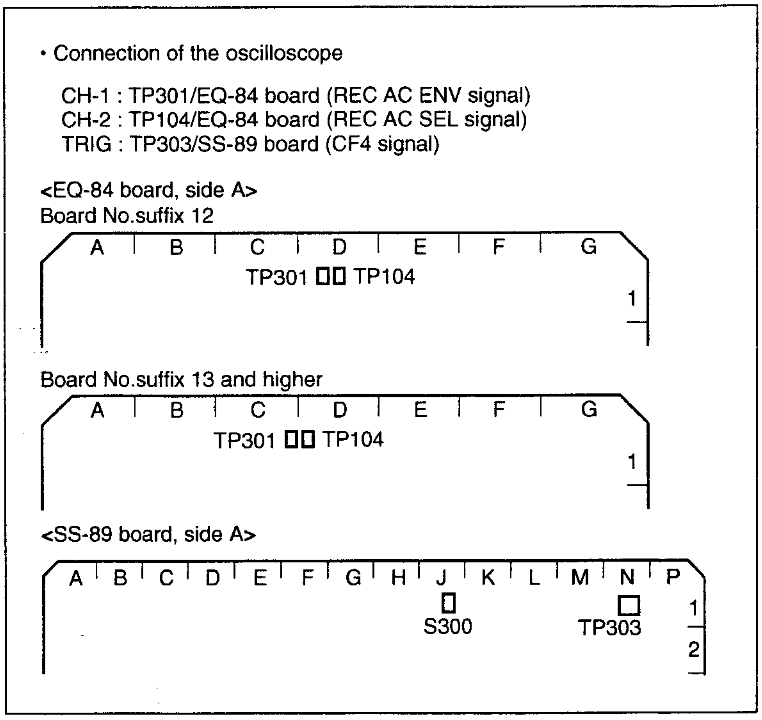
CH-1: TP301/EQ-84 board (REC AC ENV signal)
CH-2: TP104/EQ-84 board (REC AC SEL signal)
TRIG: TP303/SS-89 board (CF4 signal)

- Oscilloscope setting:

CH-1: 500 mV to 1 V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

3. Function Menu Setting

Turn on the power, then set the F1 (CAPSTN) of function menu Page4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)



- Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)

<EQ-84 board, side A>
Board No.suffix 12
A
B
C
D
E
F
G
TP301
TP104
1
Board No.suffix 13 and higher
A
B
C
D
E
F
G
TP301
TP104
1
<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
S300
TP303
1
2

Preparation

Check

4. Check in the PLAY Mode

(1) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

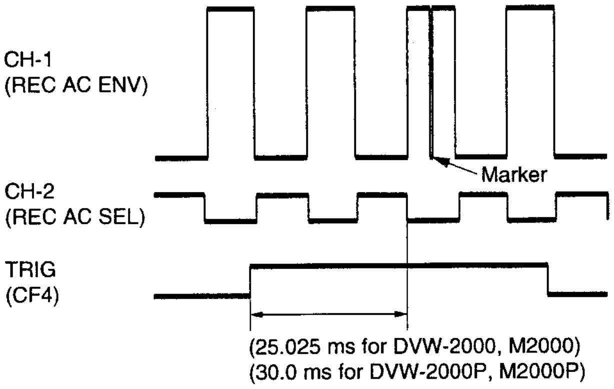
(2) Check that the RF envelope waveform with the marker as shown in the figure appears following the positive slope of the CF4 signal.
Use this portion of the RF envelope waveform when checking video tracking in the PLAY mode.
If extremely abnormal waveform (Fig. 1) is output after replacing the upper drum assembly, remove and re-attach the upper drum assembly.
- Refference:
  Section 5-2. Upper Drum Assembly Replacement

Note

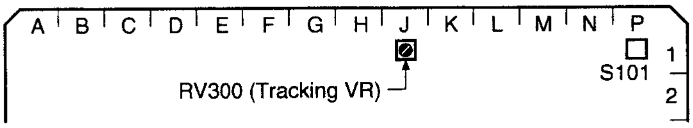
The RF envelope waveform is recorded on ZR2-1/ZR2-1P (00:00 to 15:00) only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

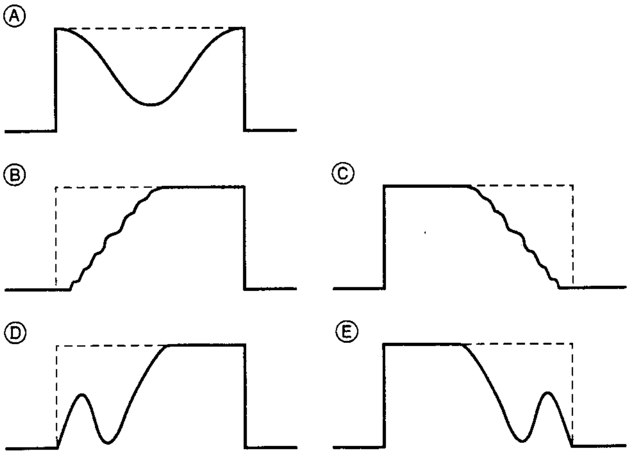
- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)


CH-1
(REC AC ENV)
Marker
CH-2
(REC AC SEL)
TRIG
(CF4)
(25.025 ms for DVW-2000, M2000)
(30.0 ms for DVW-2000P, M2000P)

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
S101
2
RV300 (Tracking VR)

<Fig.1 : NG waveforms of AC ENV signal (Examples)>



(4) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(5) In the step (4) state, check to see that the RF envelope waveform satisfies specification 1.

Note

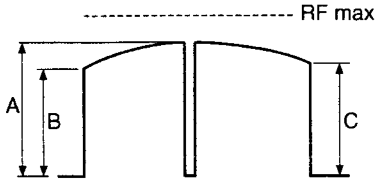
If the level fluctuates, read the average value.

(6) If the level fluctuates, rotate the tracking VR (RV300/SS-89 board) clockwise to maximize the output level at the center of the RF envelope waveform, and check that the fluctuation amount satisfies specification 2.

If specifications 1 and 2 are not satisfied, perform the adjustment in the Section 6-6-2 (Tape Entrance Side) or Section 6-6-3 (Tape Exit Side).

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Head-to-tape contact>

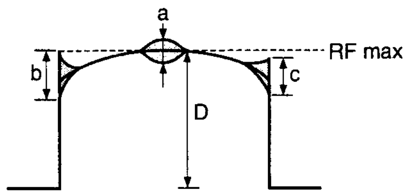


A = RF max × 0.8

Spec.1 : Output levels (B and C) at the tape entrance side and exit side are more than 70 % of the center level (A).

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$

<Fluctuation>



D = Average maximum level at waveform center

Spec.2 : Fluctuation amounts (a, b, c) at the drum center portion, entrance side and exit side are less than 20 % of the average maximum level (D).

$\frac{a}{D} \times 100 \leqq 20\ \%$ $\frac{b}{D} \times 100 \leqq 20\ \%$ $\frac{c}{D} \times 100 \leqq 20\ \%$

Video Tracking Check (PLAY)

5. Check in the REV × 1 Mode

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(2) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00).

(3) Set the REV × 1 mode, and check that the RF envelope waveform satisfies specification 3.

If the waveform at the entrance is without the specification 3, adjust tracking at the drum entrance. (Refer to Section 6-6-2.)
If the waveform at the exit is NG, adjust the height of TG-5 before tracking adjustment.

Note

Adjusting the height of TG-5
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

If the specification is still not satisfied, adjust tracking at the drum exit. (Refer to Section 6-6-3.)

(4) Also check that the tape is running with maintaining the state of the specification 4.

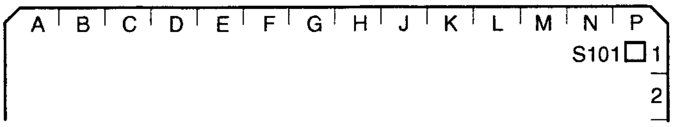
If specification 4 is not satisfied, first adjust the height of TG-5.

Note

Adjusting the height of TG-5:
Be sure to make an adjustment within the height where no tape curl occur at upper and lower flanges.

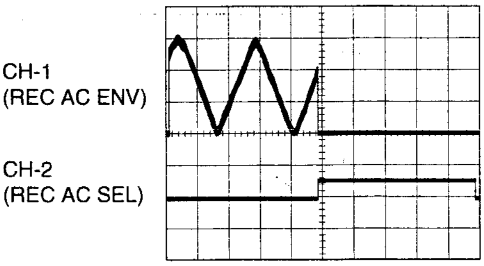
When the specification 4 is not still satisfied even after adjusting the height of TG-5, adjust the tracking at tape exit. (Refer to Section 6-6-3.)

<SS-89 board, side A>



- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)

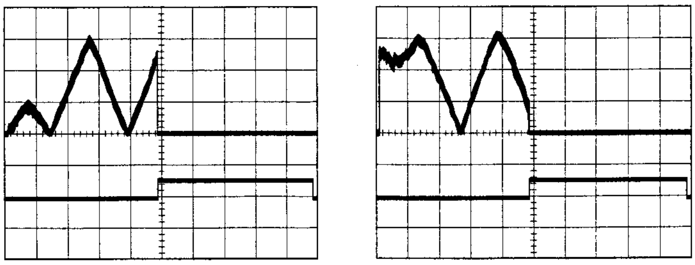
(OK)



Spec.3 : Appears waveforms with no lacking.
Uniform waveforms without variation.

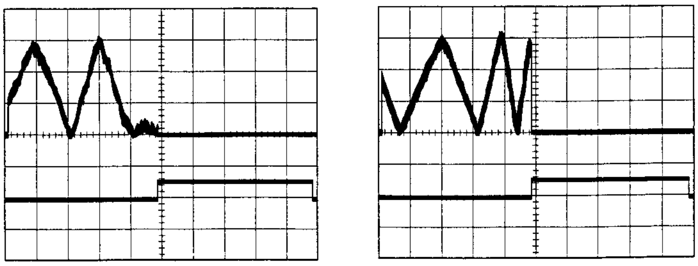
- In the case of the drum entrance side is NG (Example) :

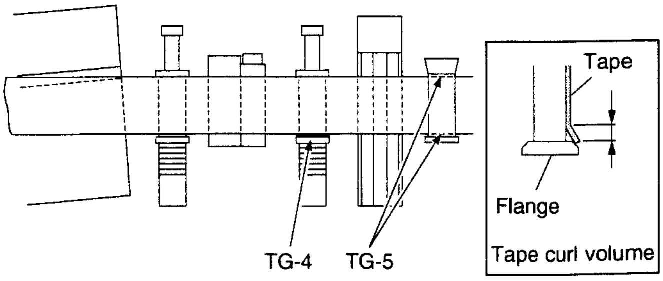
(NG) (NG)



- In the case of the drum exit side is NG (Example) :

(NG) (NG)





Spec.4 : Lower flange of TG-4
The tape curl is less than 1/10 of the tape width.

Video Tracking Check (REV × 1)

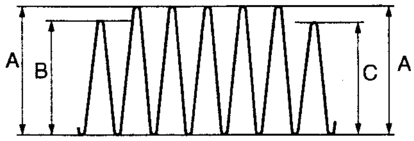
6. Check in the REV × 10 Mode

(1) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00).

(2) Set the REV × 10 mode, and check that the RF envelope waveform satisfies specification 5.

If specification 5 is not satisfied, perform the adjustment in the Section 6-6-2 (Tape Entrance Side) or Section 6-6-3 (Tape Exit Side).

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.5 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)

Video Tracking Check (REV × 10)

7. Check in the F.FWD and REW Modes

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board (ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board (ADV BD ENV signal)
TRIG: TP100/ EQ-84 board (ADV AC SEL signal)

(2) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00).

(3) Set the F.FWD mode, and check that the RF waveform satisfies specification 6 and specification 7.

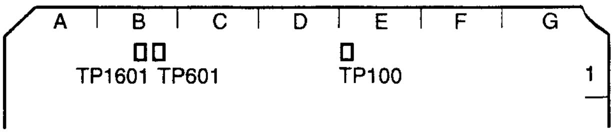
(4) Set the REW mode, and check that the RF waveform satisfies specification 6 and specification 7.

If specifications 6 and 7 are not satisfied, perform the adjustment in the Section 6-6-2 (Tape Entrance Side) or Section 6-6-3 (Tape Exit Side).

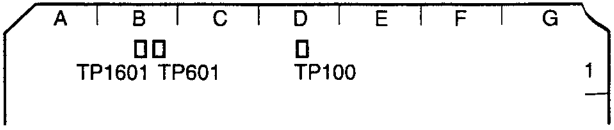
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

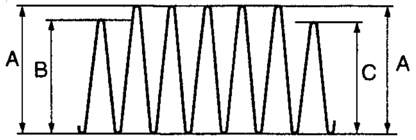
<EQ-84 board, side A >
Board No.suffix 12



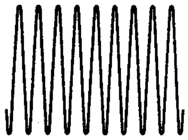
Board No.suffix 13 and higher



- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.6 : $\frac{B}{A} \times 100 \geqq 70$ % (Tape entrance side)
$\frac{C}{A} \times 100 \geqq 70$ % (Tape exit side)



Spec.7 : Appears waveforms with no lacking.

Video Tracking Check (F.FWD, REW)

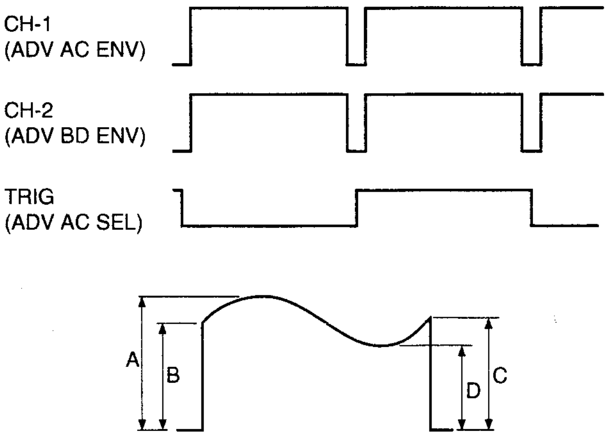
8. Check the ADVANCE Head Contact

(1) Play back the alignment tape ZR5-1/ZR5-1P in the PLAY mode.

(2) Check that the RF envelope waveforms of ADV AC ENV and ADV BD ENV satisfy specification 8.

(3) Turn off the power, then remove the alignment tape.

- Alignment tape : ZR5-1/ZR5-1P
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec.8 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 70\ \%$ $\frac{C}{A} \times 100 \geqq 70\ \%$ $\frac{D}{A} \times 100 \geqq 70\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

ADVANCE Head Contact Check

9. Check the Analog Betacam Y/C Head Contact

Note

This step is not reqired for DVW-2000/2000P.

(1) Set the oscilloscope as follows:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(2) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(3) Set Bit-1, Bit-2 and Bit-3 of DIP switch S101 on the SS-89 board to ON (pushed up).

(4) Turn on the power, then play back CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

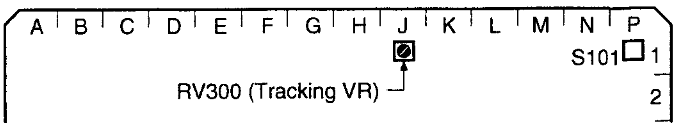
(5) Rotate the tracking VR (RV300/SS-89) to maximize the level at the center of the RF envelope waveform.

(6) Check that the RF envelope waveform is output in each channel.
Check that the Ya and Ca RF envelope waveforms satisfy specification 9.

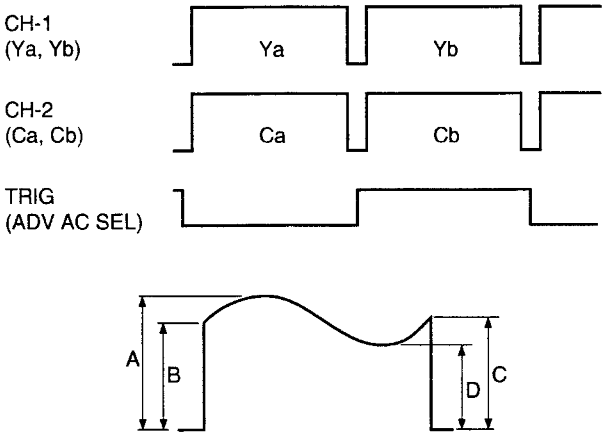
(7) Turn off the power, then remove CR2-1B/CR2-1B PS.

(8) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

<SS-89 board, side A>



• Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)



Spec.9 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A}\times100 \geqq 75\ \%$ $\frac{C}{A}\times100 \geqq 75\ \%$ $\frac{D}{A}\times100 \geqq 75\ \%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

Analog Betacam Y/C Head Contact Check

10. Check the CONFI Head Output

(1) Connect the oscilloscope as follows:
CH-1: TP701/EQ-84 board
(CNF AC ENV signal)
CH-2: TP1701/ EQ-84 board
(CNF BD ENV signal)
TRIG: TP102/ EQ-84 board
(CNF AC SEL signal)
Oscilloscope setting:
CH-1: 500 mV/DIV
CH-2: 500 mV/DIV
TRIG: 5 V/DIV
TIME: 5 ms

(2) Set the recording tape BCT-D32 and put a weight (about 1000 g) onto it.

(3) Turn on the power.

(4) While pressing the PLAY button, press the REC button to set the recording mode.

(5) Check that the RF waveform is output from CH1 and CH2 during recording as shown in the figure and that specification 10 is satisfied.

(6) Turn off the power, then remove the recording tape.

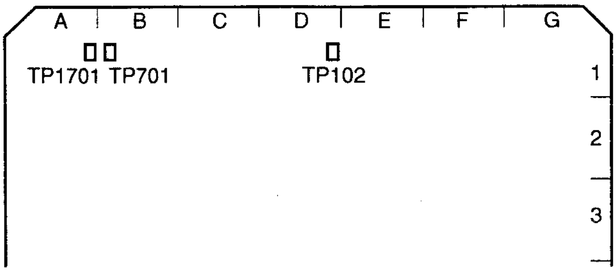
11. Function Menu Setting

Turn on the power, then return F1 (CAPSTN) of function menu Page 4 to the customer setting.

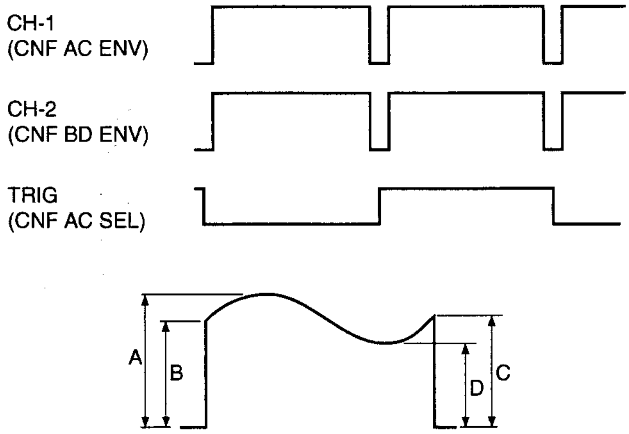
- Connection of the oscilloscope

CH-1 : TP701/EQ-84 board (CNF AC ENV signal)
CH-2 : TP1701/EQ-84 board (CNF BD ENV signal)
TRIG : TP102/EQ-84 board (CNF AC SEL signal)

<EQ-84 board, side A>



<CONFI output waveform>



Spec.10 : The whole waveform should be 70 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 70\%$ $\frac{C}{A} \times 100 \geqq 70\%$ $\frac{D}{A} \times 100 \geqq 70\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

CONFI Head Output Check

6-6-2. Tracking Adjustment at the Tape Entrance Side

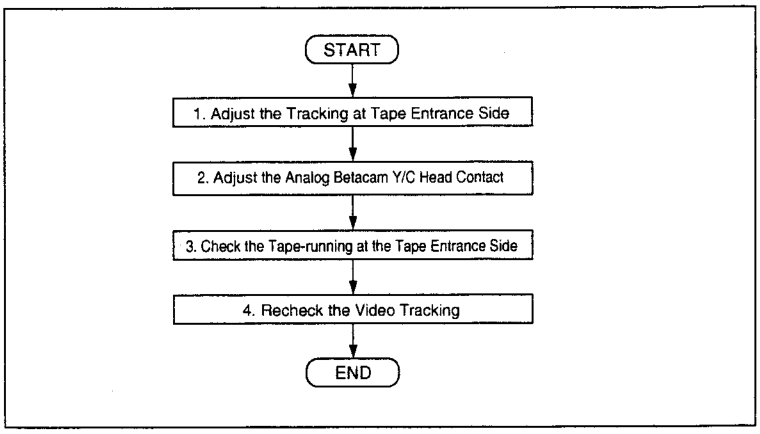
This adjustment should be performed when the specifications have not been satisfied in Section 6-6-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-6-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat to the entrance and exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied. Perform adjustments paying attention to the followings:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.


START
1. Adjust the Tracking at Tape Entrance Side
2. Adjust the Analog Betacam Y/C Head Contact
3. Check the Tape-running at the Tape Entrance Side
4. Recheck the Video Tracking
END

Flow Chart of Tracking Adjustment at the Tape Entrance Side

1. Adjust the Tracking at the Tape Entrance Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

(2) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level. (Fig. 1)

(4) Loosen the height adjustment nut of TG-2 so that the tape does not in contact the upper flange. (Fig. 2)

(5) Rotate the height adjustment nut of TG-1 to flatten the RF envelope waveform. (Fig. 1)

If the waveform does not become flat, perform the following adjustment (① to ③).

① Clean the lower drum lead with a wooden stick. (Refer to Section 4-2-4.)

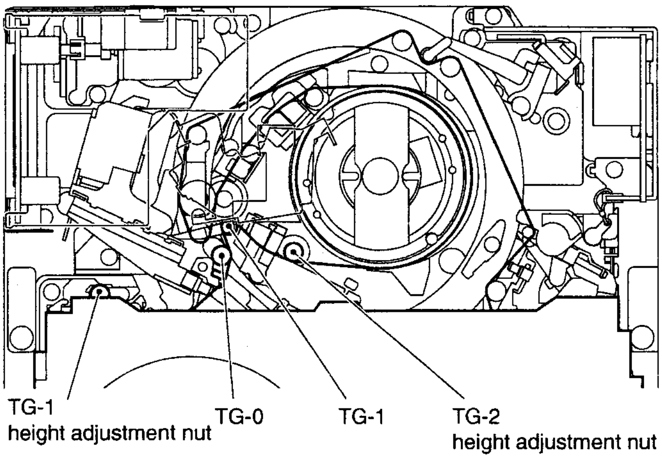
② While running the tape, press the tape lightly with the wooden stick and check that the tape does not float from the lead.

③ Adjust the height of TG-1 so that the RF envelope waveform becomes as flat as possible within the scope of Specification 11 in Fig. 3.

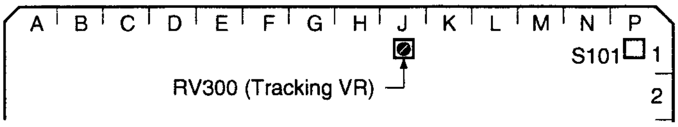
(6) Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 4)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

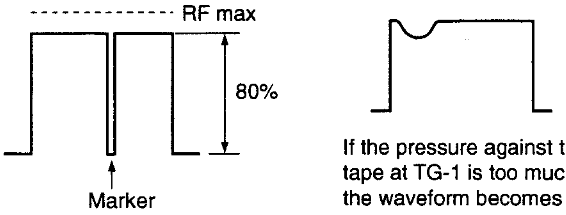

TG-1
height adjustment nut
TG-0
TG-1
TG-2
height adjustment nut

<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
S101
1
2
RV300 (Tracking VR)

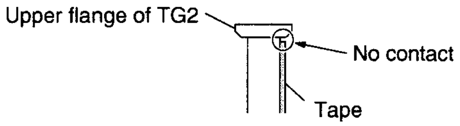
- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>

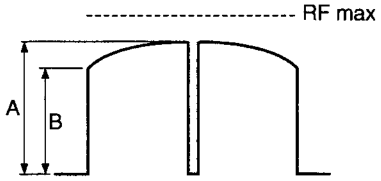

RF max
80%
Marker

If the pressure against the tape at TG-1 is too much, the waveform becomes as shown in the upper figure. (NG)

<Fig.2>


Upper flange of TG2
No contact
Tape

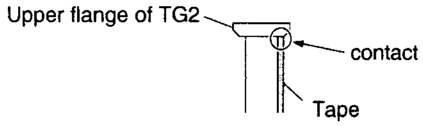
<Fig.3>



A = RF max × 0.8

Spec.11: $\frac{B}{A} \times 100 \geqq 70$ %

<Fig.4>


Upper flange of TG2
contact
Tape

Tracking Adjustment at Tape Entrance Side (PLAY)

2. Adjust the Analog Betacam Y/C Head Contact

Note

This step is not required for DVW-2000/2000P.

(1) Turn off the power, then remove the alignment tape.

(2) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)
Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
CH-2: 200 to 500 mV/DIV
TIME: 5 ms/DIV

(3) Set the alignment tape CR2-1B/CR2-1B PS and put a weight (about 1000 g) onto it.

(4) Set Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to ON (pushed up).

(5) Turn on the power, then playback the CR2-1B/CR2-1B PS in the PLAY mode.

Note

The Betacam/Betacam SP Ya and Yb signals will be output from TP601 during playback of the CR2-1B/CR2-1B PS.
Also the Betacam/Betacam SP Ca and Cb signals will be output from TP1601.

(6) Turn the tracking VR (RV300/SS-89 board) so that the center portion of the RF envelope waveform becomes the maximum output level.

(7) Check that the RF envelope waveform is output in each channel. Check that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 12.

If specification 12 is not satisfied, perform step (12) and later.

(8) Turn off the power, then remove the alignment tape CR2-1B/CR2-1B PS.

(9) Reset Bit-1, Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

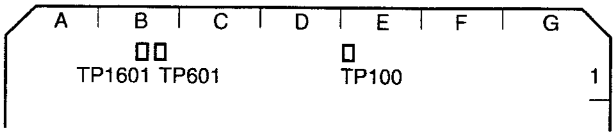
(10)Set the alignment tape ZR2-1/ZR2-1P and put the weight (approx. 1000 g) onto it.

(11)Turn on the power, then perform following step 3 and later.

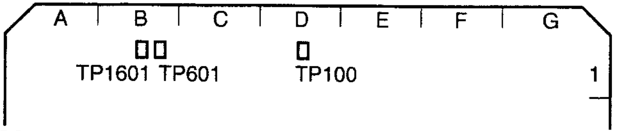
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

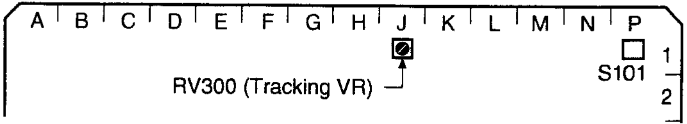
<EQ-84 board, side A>
Board No.suffix 12



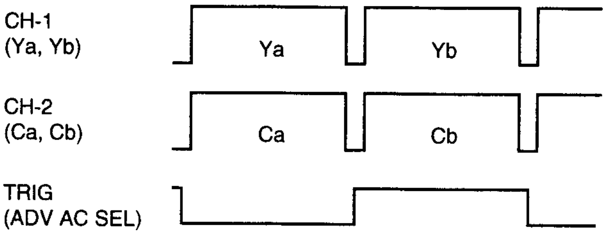
Board No.suffix 13 and higher

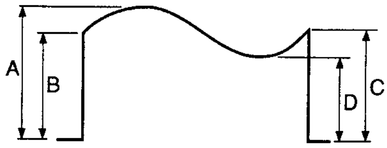


<SS-89 board, side A>



- Alignment tape : CR2-1B/CR2-1B PS
S101-1/SS-89 board : ON (Tracking VR : Enabled)





Spec.12 : The whole waveform should be 75 % output or more than the maximum level.

$\frac{B}{A} \times 100 \geqq 75\%$ $\frac{C}{A} \times 100 \geqq 75\%$ $\frac{D}{A} \times 100 \geqq 75\%$

B, C, and D are the output levels at rising edge, falling edge, and minimum level of the waveform, respectively.

(12)Loosen the height adjustment nut of TG-2 so that the tape does not touch the upper flange. (Fig. 5)

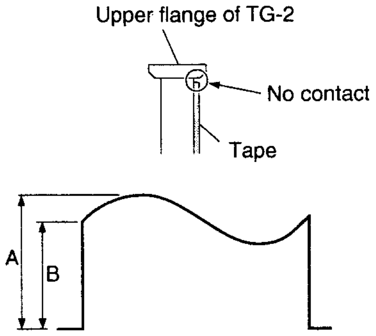
(13)Rotate the height adjustment nut of TG-1 and adjust so that the Ya RF envelope waveform and Ca RF envelope waveform satisfy specification 13.

(14)Rotate the height adjustment nut of TG-2 clockwise to contact the tape. (Fig. 6)

Note

Be sure to contact the upper flange of TG-2 to the tape in the PLAY mode.

<Fig.5>

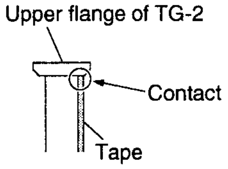


Spec.13 : The output of the entrance waveform must be 80 % of maximum value.

$\frac{B}{A}$ x 100 = 80 % (Not B/A x 100 > 80 %)

However if the outputs of the entrance waveform of the Ya RF envelope waveform and Ca RF envelope waveform are both not 80 % of the maximum value, adjust so that the RF envelope with the smaller entrance waveform output becomes 80 % of the maximum value.

<Fig.6>



Analog Betacam Y/C Head Contact Adjustment

(15)Turn off the power, then remove the CR2-1B/CR2-1B PS.

(16)Reset Bit-2 and Bit-3 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

(17)Connect the oscilloscope as follows:

CH-1: TP301/EQ-84 board
(REC AC ENV signal)
CH-2: TP104/EQ-84 board
(REC AC SEL signal)
TRIG: TP303/SS-89 board
(CF4 signal)

(18)Change the oscilloscope setting as follows:

CH1: 500 mV to 1V/DIV
CH-2: 5 V/DIV
TIME: 2 to 5 ms/DIV

(19)Set the alignment tape ZR2-1/ZR2-1P and put a weight (about 1000 g) onto it.

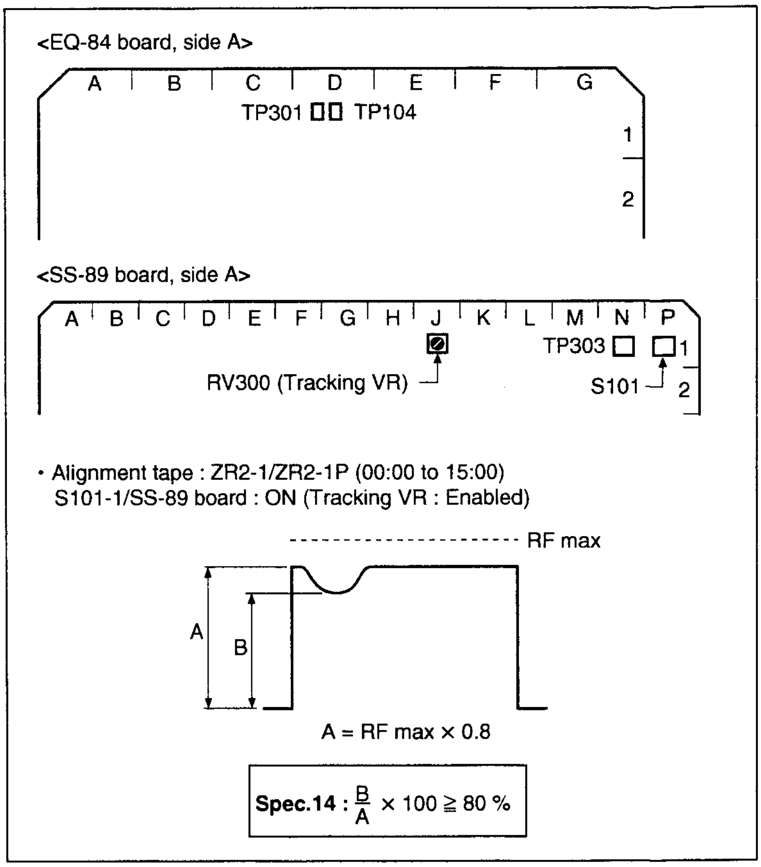
(20)Turn on the power, then play back the alignment tape (00:00 to 15:00) in the PLAY mode.

(21)Rotate the tracking VR (RV300/SS-89 board) clockwise to set the center of the RF envelope waveform to 80 % of the maximum output level.

(22)Check that the levels A and B shown in the figure satisfy specification 14.

(23)Reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

If specification 14 is not satisfied, perform the adjustment from (3) of step 1 and later again.



- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

Spec.14 : $\frac{B}{A} \times 100 \geqq 80$ %

Tracking Adjustment

3. Check the Tape-running at the Tape Entrance Side

(1) Check the tape-running at the tape entrance side in each of the following modes:

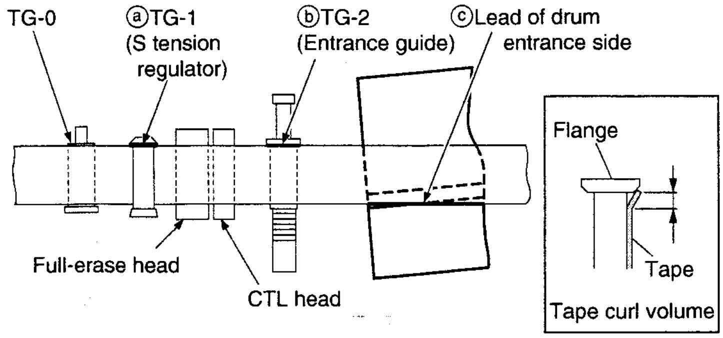
- PLAY mode
- F.FWD mode

If the curl of any of the tape guides does not satisfy specification 15, perform the adjustment from (3) of step 1 and later again.

(2) Check the tape-running at the tape entrance in each of the following modes:

- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the curl of any of the tape guides does not satisfy specification 16, perform the adjustment from (3) of step 1 and later again.



Spec.15 : ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.16 : ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at the Tape Entrance Side

4. Recheck the Video Tracking

Perform steps from 3 to 11 in Section 6-6-1.

Note

After adjusting, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

6-6-3. Tracking Adjustment at the Tape Exit Side

This adjustment should be performed when the specifications have not been satisfied in Section 6-6-1 (steps 4, 5, 6, and 7.)
If you start the operation from this adjustment, perform the settings (from steps 1 to 3) in Section 6-6-1 first.

Note

In the video tracking adjustment, the RF envelope waveform should be made flat from the entrance to the exit. However it may not be completely flat in some cases. For such cases, there should be no problems only that the specifications are satisfied.
Perform adjustments paying attention to the following:

- Perform only the adjustment indicated.
- Do not rotate screws other than those specified in the adjustments.

Take note that performing adjustments other than those required for making the RF envelope waveform flat may result in damages such as abnormal wear of mechanism parts and accompanying deterioration of electrical characteristics.

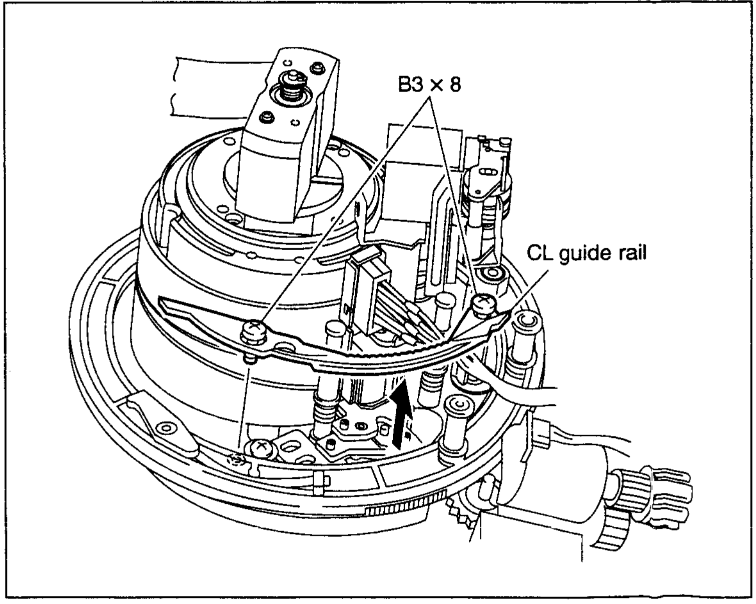
1. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws to remove the CL guide rail.

Notes

- When removing the CL guide rail, be careful not to damage the tape.
- Do not pull out the screws because the screw holes on the CL guide rail are shaped in such a way to prevent screws from falling.



CL Guide Rail Removal

2. Adjust the Tracking at the Tape Exit Side

(1) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(2) Turn on the power, then play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Rotate the tracking VR (RV300/SS-89 board) to set the center of the RF envelope waveform to the maximum output level.

(4) Turn the height adjustment nut of TG-3 counterclockwise by one to two turns so that the tape does not in contact with the upper flange of TG-3.

Note

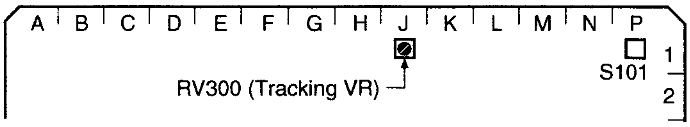
Don't turn excessively the nut, or the tape bottom edge does in contact with the lower flange of TG-3.

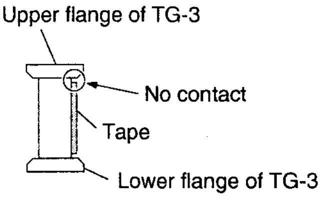
(5) Turn the height adjustment nut of TG-4 clockwise so that the tape does not in contact with the lower flange of TG-4.

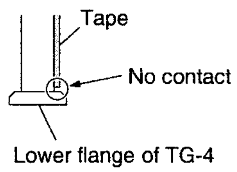
(6) Check that the RF envelope waveform satisfies the specification 17. (Fig. 1)
If satisfied, perform the step (8) and later.
If not, perform the step (7) and later.

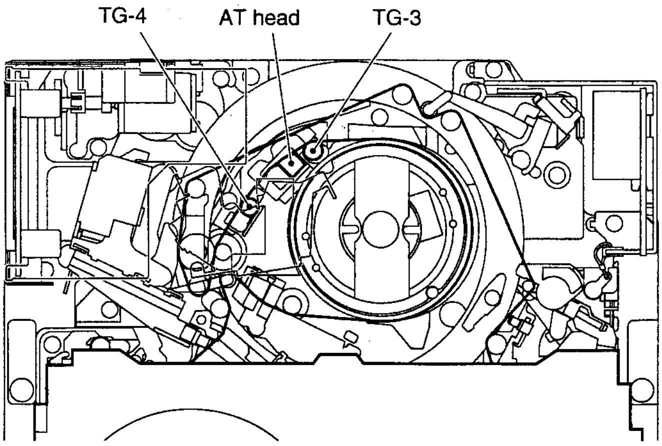
(7) Turn the zenith adjustment screw of the AT head so that the right portion of the RF envelope waveform makes 60 % or less of the maximum output level. (specification 17)
At this time, check that the tape does not in contact with both upper flange of TG-3 and lower flange of TG-4.
If the tape contacts either flange, repeat step (4) or (5).
If the tape moves upward or downward following the guide flange movement, perform the following adjustment.
This trouble cause is uneven tape tension at upside or downside of the tape caused by AT head zenith.
- If the tape moves upward at TG-3:
  Turn the zenith adjustment screw counterclockwise.
- If the tape moves downward at TG-4:
  Turn the zenith adjustment screw clockwise.

<SS-89 board, side A>



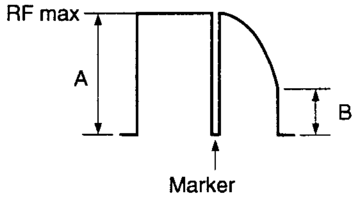




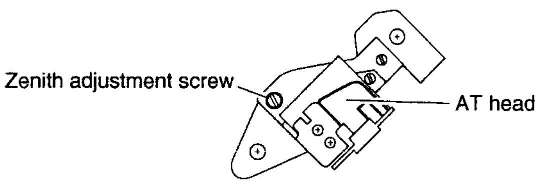


- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : ON (Tracking VR : Enabled)

<Fig.1>



Spec.17 : $\frac{B}{A} \times 100 = 30 \pm 30$ %



(8) Turn the height adjustment nut of TG-3 clockwise so that the tape is in contact with the upper flange and the RF envelope waveform becomes flat. (Fig. 2)
Simultaneously, ensure that the tape does not in contact with the lower flange of TG-4.

If the waveform does not become flat, perform the steps ① to ③ (check and adjustment) below:

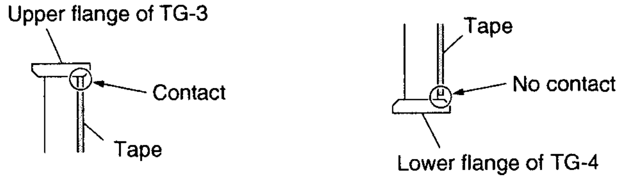
① Clean the drum lead with a wooden stick. (Refer to Section 4-2-4.)

② Press down the tape by wooden stick very lightly and check to see that the tape is running without aparting from the drum lead.

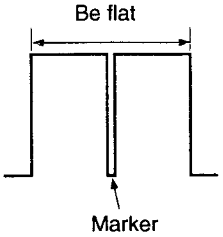
③ If the waveform does not become flat even after performing steps ① and ②, adjust the height of TG-3 so that the RF envelope waveform is nearly flat within the range of the specification 18 shown in the Fig.3. At this time, do not overpress the tape at TG-3.

Note

After adjusting the height of TG-3 in step ③ above, be sure to check the height of AT head (Refer to Section 6-6-6). If the AT head height does not satisfy the specification, repeat the video tracking adjustment.

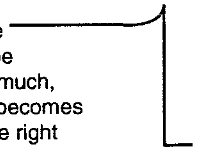


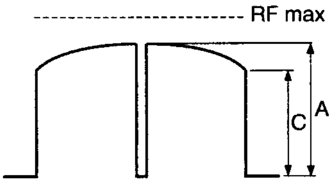
<Fig.2>



<Fig.3>

In the pressure against the tape at TG-3 is too much, the waveform becomes as shown in the right figure. (NG)





A = RF max × 0.8

Spec.18 : $\frac{C}{A} \times 100 \geqq 70$ %

(9) Adjust the height of TG-4 so that the lower flange of TG-4 in contact with the tape.

(10)Check the tape-running at the tape exit side in the following modes:

- PLAY mode
- F. FWD mode
- REW mode
- REV × 10 mode
- REV × 1 mode
- REV × 1/30 mode

If the tape curl at TG-3 does not satisfy the specification 19, perform the steps ① and ② (adjustment) below.

① Change the zenith of the AT head within the range of the specification 17.
(Refer to previous step (7).)

② Perform the tracking adjustment again.
(Refer to previous steps (2) through (10).)

(11)If the AT head zenith was changed in above ①, perform the checks and adjustments described below:

- AT head height (Refer to Section 6-6-6.)
- AT head azimuth (Refer to Section 6-6-7.)
- AT head head-to-tape contact
  (Refer to Section 6-6-8.)
- AT head position
  (Refer to Section 6-6-9.)

3. Attach the CL Guide Rail

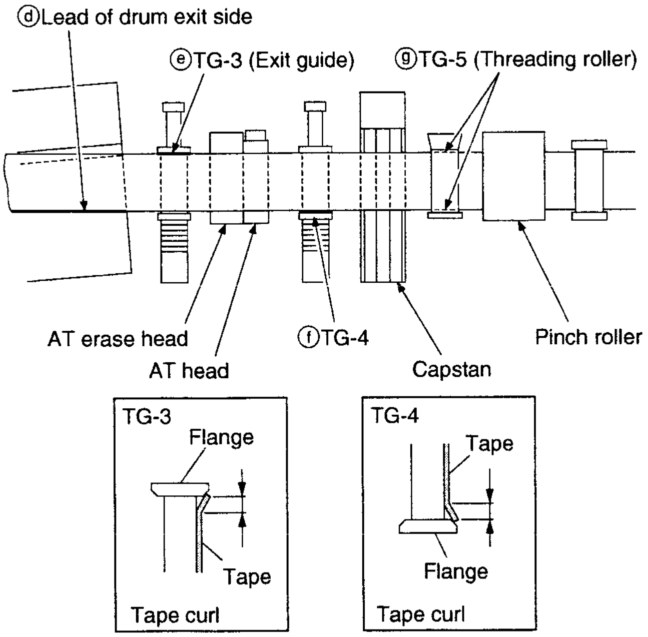
Turn off the power, then attach the CL guide rail.

4. Recheck the Video Tracking

Perform the steps 4 through 11 in Section 6-6-1 again.

Note

After adjustment, be sure to reset Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).



Spec.19 : ⓓ Lead of drum exit side
The tape runs without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5 (Threading roller)
The tape runs without any curl at the upper and lower flanges.

Tracking Adjustment at the Tape Exit Side

6-6-4. CTL Head Height Check and Adjustment

Tools

• Alignment tape ZR2-1 (for DVW-2000/M2000):	8-960-073-11
ZR2-1P (for DVW-2000P/M2000P):	8-960-073-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Tape guide adjustment driver (MW-261):	J-6322-610-A

Preparation

1. Set the Alignment Tape

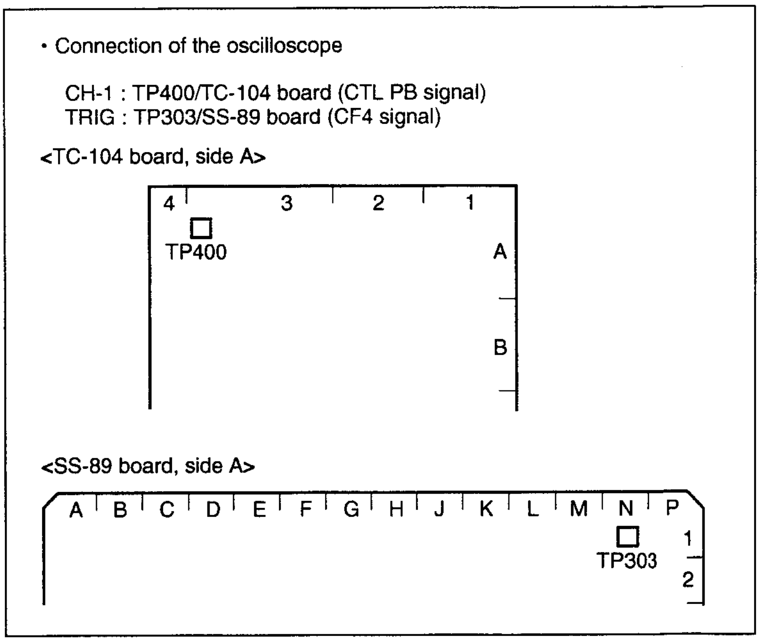
(1) Turn off the power.

(2) Set the alignment tape ZR2-1/ZR2-1P and put a weight (about 1000 g) onto it.

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP400/TC-104 board (CTL PB signal)
TRIG: TP303/SS-89 board (CF4 signal)
Oscilloscope setting:
CH-1: 1 V/DIV
TIME: 5 ms/DIV



- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

Preparation

Check

3. Check the CTL Head Height

Note

Never rotate the screw of portion C shown in the figure, or that might cause malfunctioning of tape running and head performance.

(1) Play back the alignment tape ZR2-1/ZR2-1P (15:00 to 25:00) in the PLAY mode.

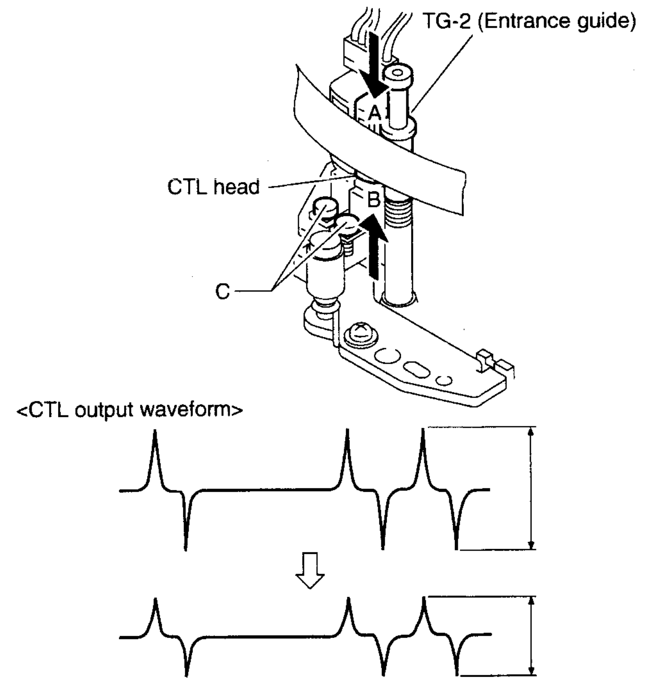
(2) Press down the portion A of the tape shown in figure, and then check to see that the level decreases by pressing the tape.

If the level increases, perform step 4-Ⓐ.

(3) Push up the portion B of the tape, and then check to see that the level decreases by pushing the tape.

If the level increases, perform step 4-Ⓑ.

- Alignment tape : ZR2-1/ZR2-1P (15:00 to 25:00)



Spec. : The level decreases when pressing down and when pushing up the alignment tape.

CTL Head Height Check

Adjustment

4. CTL Head Height Adjustment

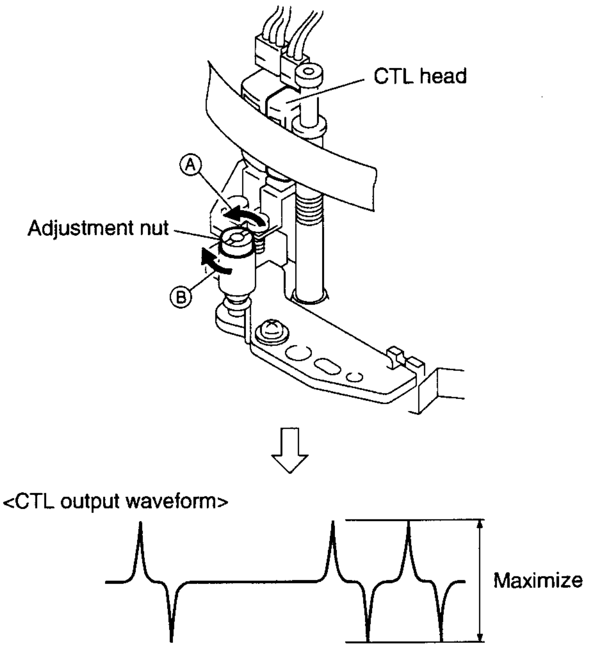
Ⓐ When the Level Increased by Pressing Down the Tape

Turn the adjustment nut counterclockwise (in the arrow Ⓐ direction) so that the output waveform is maximum.

Ⓑ When the Level Increases by Pushing Up the Tape

Turn the adjustment nut clockwise (in the arrow Ⓑ direction) so that the output waveform is maximum.

- Alignment tape : ZR2-1/ZR2-1P (15:00 to 25:00)



CTL Head Height Adjustment

6-6-5. CTL Head Position Check and Adjustment

Precaution

The CTL head position adjustment is closely related to the AT head position adjustment.
Be sure to confirm the AT head position after adjusting the CTL head position.

Tools

• Alignment tape ZR2-1 (for DVW-2000/M2000):	8-960-073-11
ZR2-1P (for DVW-2000P/M2000P):	8-960-073-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape ZR2-1/ZR2-1P and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

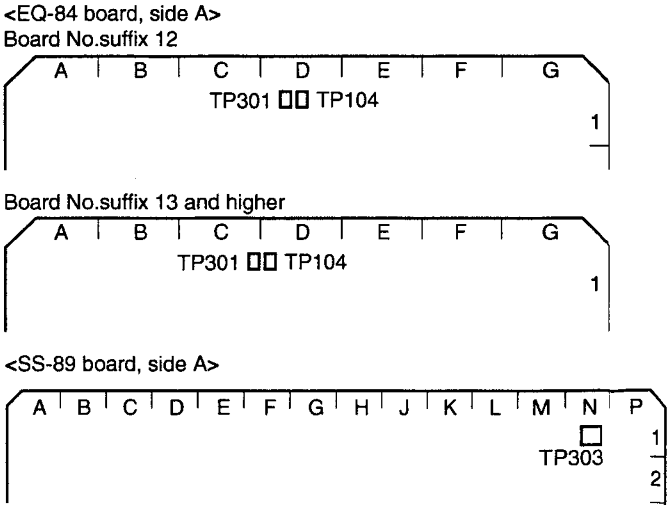
CH-1:	TP301/EQ-84 board (REC AC ENV signal)
CH-2:	TP104/EQ-84 board (REC AC SEL signal)
TRIG:	TP303/SS-89 board (CF4 signal)

Oscilloscope setting:

CH-1:	500 mV to 1 V/DIV
TRIG:	5 V/DIV
TIME:	2 ms/DIV

• Connection of the oscilloscope

CH-1 : TP301/EQ-84 board (REC AC ENV signal)
CH-2 : TP104/EQ-84 board (REC AC SEL signal)
TRIG : TP303/SS-89 board (CF4 signal)



Preparation

Check

3. Check the CTL Head Position

(1) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the RF envelope waveform with the marker shown in the figure is appeared following the positive slope of the CF4 signal. (Specification 1)

Note

The RF envelope waveform is recorded on ZR2-1/ZR2-1P (00:00 to 15:00) only for A ch.

(3) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the manual tracking control.

(4) Rotate the tracking VR (RV300/SS-89 board) until the output level at the center of the RF envelope with the marker confirmed in step (2) becomes maximum, and read the level (Lv) at that time.

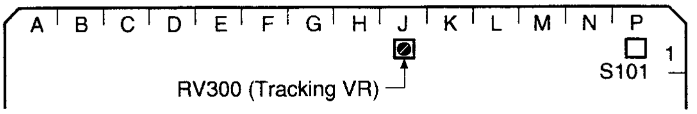
(5) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down) to fix the tracking control.

(6) Read the output level (LF) at the center of the RF envelope waveform.

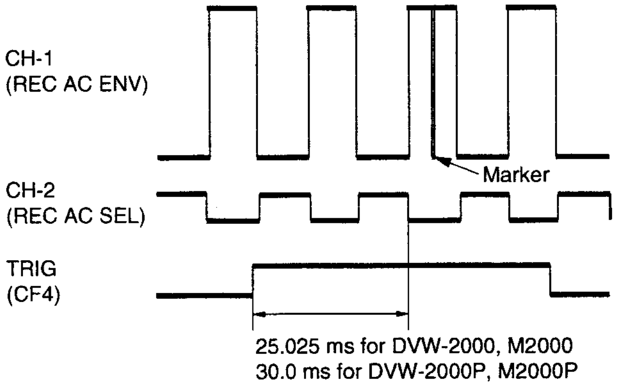
(7) Check that the level (Lv) read at step (4) and the level (LF) read at step (6) satisfy specification 2.

If they are without the specification, perform following step 4 and later.

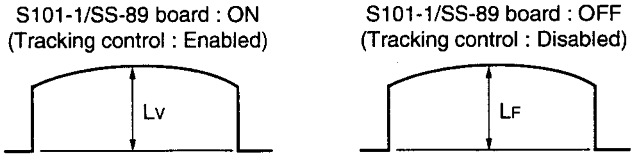
<SS-89 board, side A>


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
S101
RV300 (Tracking VR)

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
S101-1/SS-89 board : OFF (Tracking VR : Disabled)


CH-1
(REC AC ENV)
Marker
CH-2
(REC AC SEL)
TRIG
(CF4)
25.025 ms for DVW-2000, M2000
30.0 ms for DVW-2000P, M2000P

Spec.1 : The marker should appear in the positive wave that is 25.025 ms (or 30.0 ms) later than the rising edge of CF4 signal.


S101-1/SS-89 board : ON
(Tracking control : Enabled)
Lv
S101-1/SS-89 board : OFF
(Tracking control : Disabled)
LF

$$\frac{L_F}{L_V} \geqq 0.8$$

Spec.2 : When the tracking VR is disabled, the output level at the center portion of the RF envelope waveform (LF) is 80 % or more against the maximum output level (LV) under the state of the tracking control is enabled.

CTL Head Position Check

Adjustment

Note

Ensure that the tracking control is disabled (S101-1/SS-89 board ⇨ OFF) before following adjustment.

4. Adjust the CTL Head Position

(1) Loosen the securing screw of the CTL/FE head assembly by 1/4 to 1/2 turn.

(2) Insert a 3 mm flatbladed screwdriver into the notch of the CTL/FE head assembly.

(3) Adjust the CTL/FE head assembly position so that the output level at the center portion is maximum and the marker appears in the RF envelope waveform following the positive slope of the CF4 signal. (Specification 3)

Note

The RF envelope waveform is recorded on ZR2-1/ZR2-1PS (00:00 to 15:00) only for A ch.

(4) Tighten the screw loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf • cm}

5. Recheck the CTL Head Position

Perform step 3 again.

Note

After adjustment, be sure to reset Bit-1 of the Dip switch S101 on the SS-89 board to OFF (pushed down).

After the Adjustment

6. Adjust Drum Phase

Refer to Section 7-2-3.

7. Adjust Digital DT System

Refer to Section 7-2-5.

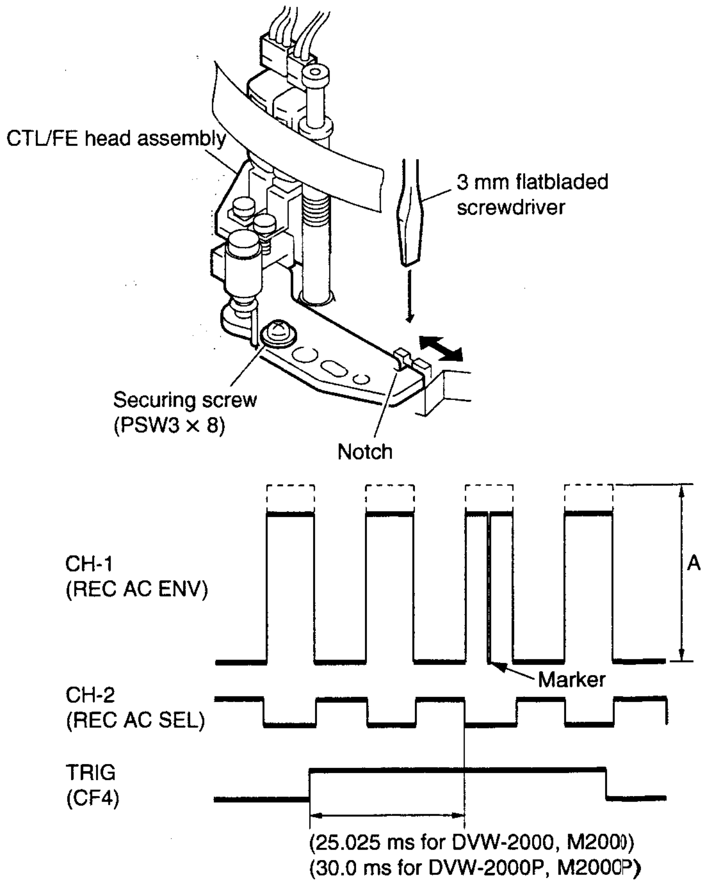
8. Adjust Analog DT System

Refer to Section 7-2-8.
(For DVW-2000/2000P: Not required)

9. Adjust the AT Head Position

Refer to Section 6-6-10.

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)
  S101-1/SS-89 board : OFF (Tracking VR : Disabled)


CTL/FE head assembly
3 mm flatbladed screwdriver
Securing screw (PSW3 x 8)
Notch
CH-1 (REC AC ENV)
A
Marker
CH-2 (REC AC SEL)
TRIG (CF4)
(25.025 ms for DVW-2000, M2000)
(30.0 ms for DVW-2000P, M2000P)

Spec.3 : Make the portion A to the maximum level.

CTL Head Position Adjustment

6-6-6. AT Head Height Check and Adjustment

Precaution

The AT head height adjustment is closely related to the azimuth adjustment, head-to-tape contact adjustment, and head position adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head height.

Tools

- Alignment tape

For DVW-M2000:	CR8-1A:	8-960-097-45
For DVW-M2000P:	CR8-1A PS:	8-960-098-45
For DVW-2000:	ZR2-1:	8-960-073-11
For DVW-2000P:	ZR2-1P:	8-960-073-61

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape and put a weight (about 1000 g) onto it.

For DVW-M2000:	CR8-1A
For DVW-M2000P:	CR8-1A PS
For DVW-2000:	ZR2-1
For DVW-2000P:	ZR2-1P

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

For DVW-M2000/P:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

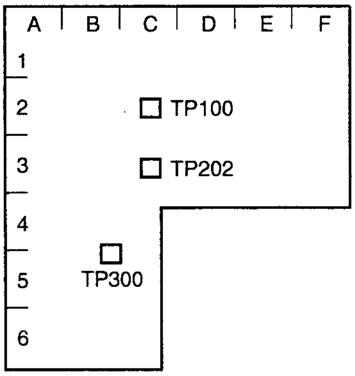
For DVW-2000/P:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

For DVW-M2000/P:
CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

For DVW-2000/P:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Height

For DVW-M2000/P:

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly press down the portion A of the tape shown in the figure, and check to see that both levels in CH-1 and CH-2 decrease by pressing the tape.

If both levels increase, perform step 4-Ⓐ.

(3) Slightly push up the portion B of the tape, and check to see that both levels in CH-1 and CH-2 decrease by pushing the tape.

If both levels increase, perform step 4-Ⓑ of next page.

For DVW-2000/P:

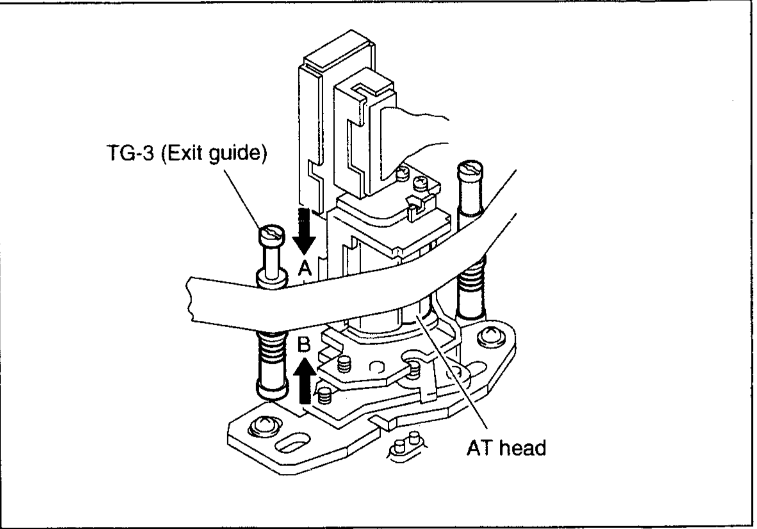
(1) Play back the 1 kHz, 0 VU signal portion (00:00 to 15:00) on the ZR2-1/ZR2-1P in the PLAY mode.

(2) Slightly press down the portion A shown in the figure, and check to see that the CUE level decreases by pushing the tape.

If the level increases, perform step 4-Ⓐ of next page.

(3) On the contrary, slightly push up the portion B of the tape, and check to see that the CUE level decreases by pushing the tape.

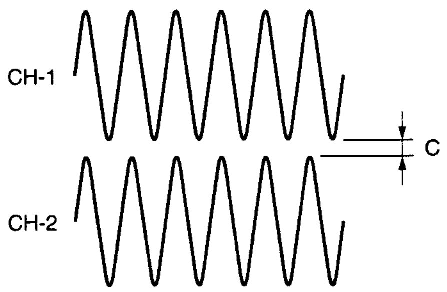
If the level increases, perform the step 4-Ⓑ.



AT Head Height Check

- Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)

<Audio output waveform>

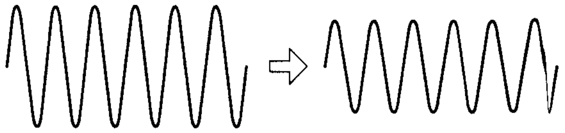


Spec. : The portion C widens when pressing down and when pushing up the alignment tape.

Specification for DVW-M2000/P

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)

<CUE output waveform>



Spec. : The level decreases when the tape is moved up and down.

Specification for DVW-2000/P

Adjustment

4. AT Head Height Adjustment

Ⓐ When the Level Increases by Pressing Down the Tape

Turn the height adjustment screw clockwise so that the output level is maximum. (Fig. 1)
(For DVW-M2000/P, make the portion C minimize.)

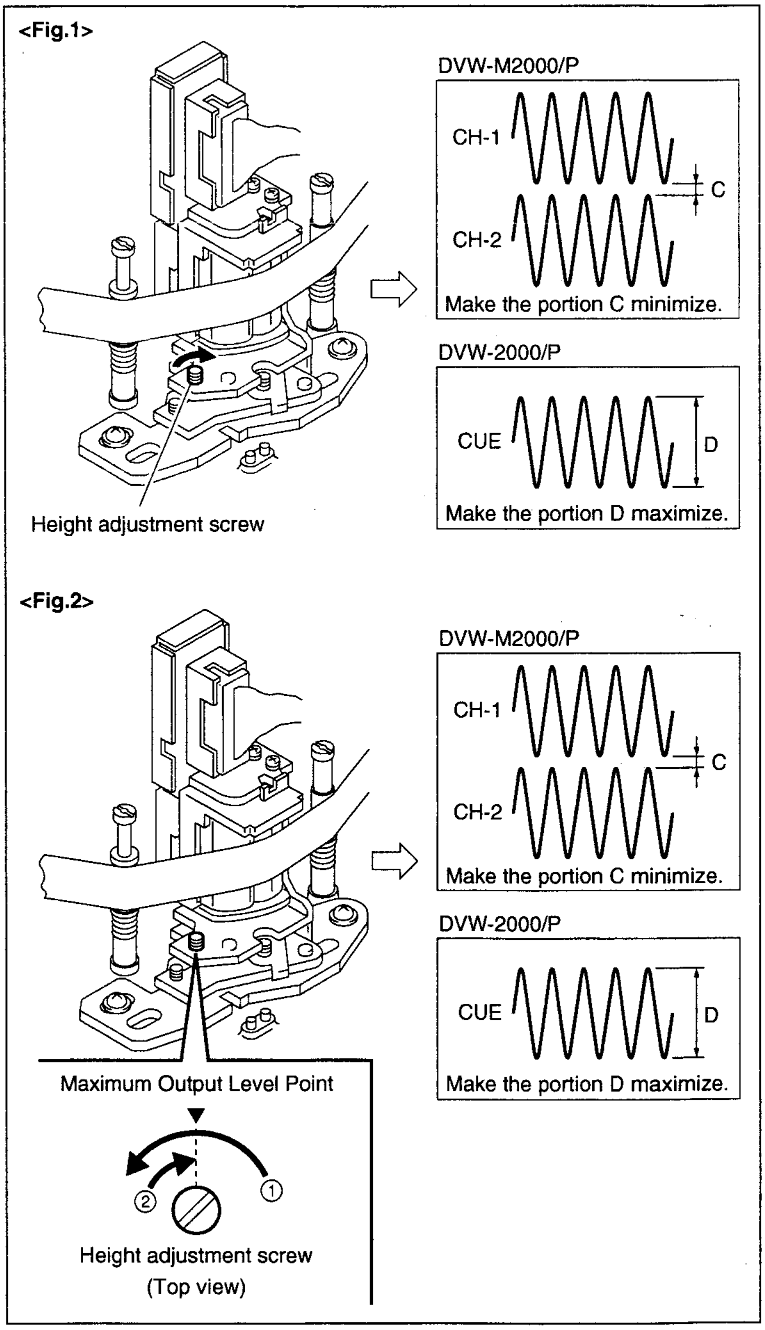
Ⓑ When the Level Increases by Pushing Up the Tape

(1) Turn the height adjustment screw counterclockwise to maximize the output level. Turn the height adjustment screw counterclockwise furthermore to decrease the output level slightly. (Arrow ① in Fig. 2)

(2) Turn the height adjustment screw clockwise and adjust so that the output level is maximum. (Arrow ② in Fig. 2)
(For DVW-M2000/P, make the portion C minimize.)

Note

To stabilize the AT head height after the adjustment, set the maximum output level with the AT head moved upward (with the height adjustment screw turned clockwise).


<Fig.1>
DVW-M2000/P
CH-1
C
CH-2
Make the portion C minimize.
DVW-2000/P
CUE
D
Make the portion D maximize.
Height adjustment screw
<Fig.2>
DVW-M2000/P
CH-1
C
CH-2
Make the portion C minimize.
DVW-2000/P
CUE
D
Make the portion D maximize.
Maximum Output Level Point
②
①
Height adjustment screw
(Top view)

AT Head Height Adjustment

After the Adjustment

5. Adjust the AT Head Azimuth

For DVW-M2000/P, refer to Section 6-6-7.
For DVW-2000/P, refer to Section 6-6-8.

6. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-6-9.

7. Adjust the AT Head Position

Refer to Section 6-6-10.

8. Recheck the AT Head Height

Refer to step 3 in this section.

9. Recheck the AT Head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-6-7. AT Head Azimuth Check and Adjustment (for DVW-M2000/M2000P)

Precautions

- The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
  Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.
- For DVW-2000/P, perform Section 6-6-8.

Tools

- Alignment tape

CR8-1A (for DVW-M2000):	8-960-097-45
CR8-1A PS (for DVW-M2000P):	8-960-098-45

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the CR8-1A/CR8-1A PS, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)

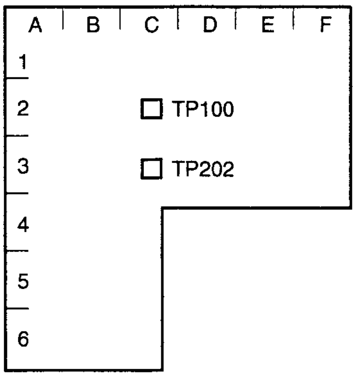
Oscilloscope setting:

CH-1: 100 mV/DIV
CH-2: 100 mV/DIV
MODE: X-Y

- Connection of the oscilloscope

CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Azimuth

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Adjust the horizontal and vertical amplitudes of lissajous waveform displayed on the oscilloscope to six cm each.

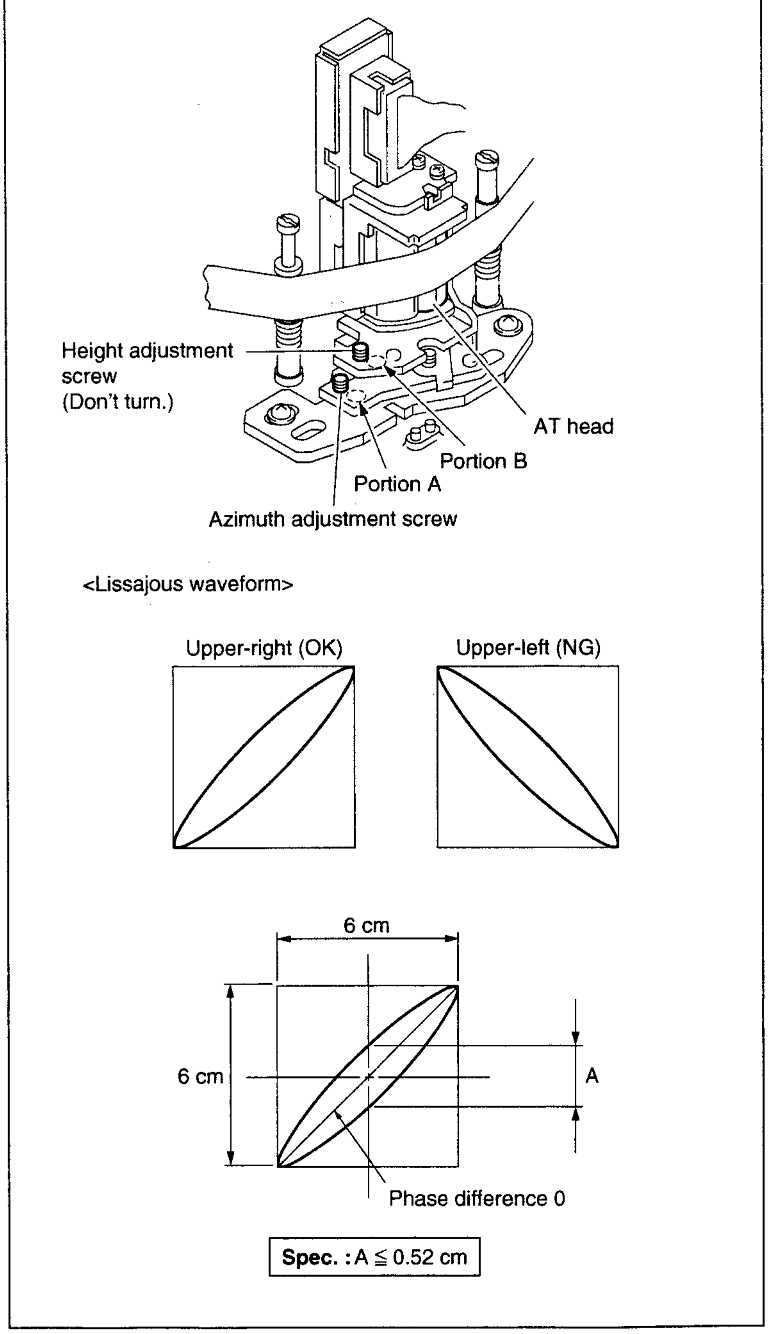
(3) Check that the lissajous waveform holds the upper-right shape.

(4) Check that the vertical amplitude at the center point in the horizontal direction satisfies the specification.

If the specification in figure is not satisfied, perform following steps 4 and later.

(5) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

- Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)



Spec. : A ≦ 0.52 cm

AT Head Azimuth Adjustment

Adjustment

4. Adjust the AT Head Azimuth

(1) Turn the azimuth adjustment screw so that the specification is satisfied.

(2) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the specification is satisfied.

After the Adjustment

5. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-6-9.

6. Adjust the AT Head Position

Refer to Section 6-6-10.

7. Check the AT Head Height

Refer to Section 6-6-6.

8. Check the AT Head Azimuth

Refer to step 3 in this section.

9. Recheck the AT head

Perform the steps 5 through 7 again.

10. Apply the Locking Compound

Refer to Section 6-1-9.

6-6-8. AT Head Azuimuth Check and Adjustment (for DVW-2000/2000P)

Precautions

- The AT head azimuth adjustment is closely related to the head-to-tape contact adjustment, head position adjustment, and head height adjustment.
  Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head azimuth.
- For DVW-M2000/P, perform Section 6-6-7.

Tools

- Alignment tape

ZR2-1 (for DVW-2000):	8-960-073-11
ZR2-1P (for DVW-2000P):	8-960-073-61

- Oscilloscope (Tektronix TDS460A or equivalent)

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the ZR2-1/ZR2-1P, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

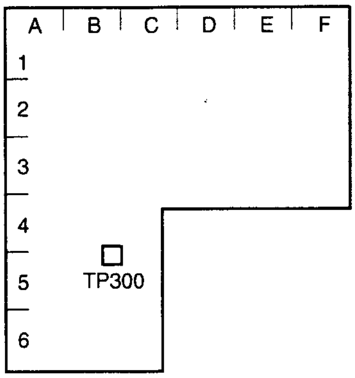
2. Connect the Oscilloscope

Connect the oscilloscope as follows:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Adjustment

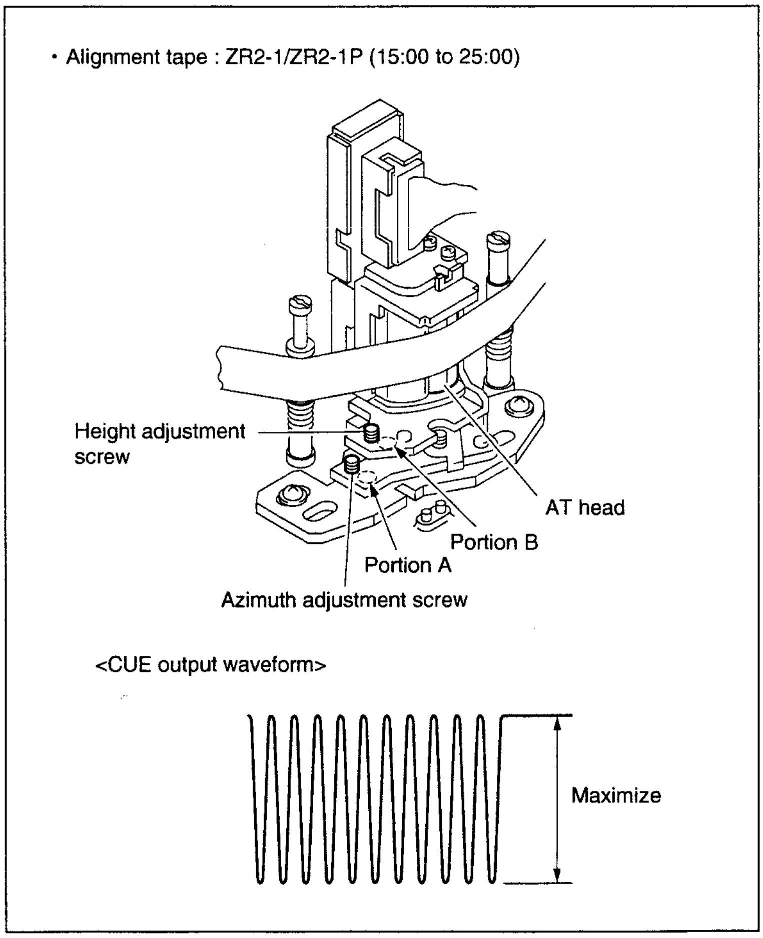
3. Adjust the AT Head Azimuth

(1) Play back the 12 kHz, 0 VU signal portion (15:00 to 25:00) on the ZR2-1/ZR2-1P in the PLAY mode.

(2) Turn the azimuth adjustment screw so that the output waveform level becomes maximum.

(3) Lightly strike the portions A and B shown in the figure with the tip of a screwdriver. Then check that the output waveform level is maximum.

- Alignment tape : ZR2-1/ZR2-1P (15:00 to 25:00)


Height adjustment screw
AT head
Portion B
Portion A
Azimuth adjustment screw
<CUE output waveform>
Maximize

AT Head Azimuth Adjustment

After the Adjustment

4. Adjust the AT Head Head-to-tape Contact

Refer to Section 6-6-9.

5. Adjust the AT Head Position

Refer to Section 6-6-10.

6. Check the AT Head Height

Refer to Section 6-6-6.

7. Apply the Locking Compound

Refer to Section 6-1-9.

6-6-9. AT Head Head-to-tape Contact Check and Adjustment

Precaution

The AT head head-to-tape contact adjustment is closely related to the head position adjustment, head height adjustment, and head azimuth adjustment.
Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head head-to-tape contact.

Tools

- Alignment tape

For DVW-M2000:	CR8-1A:	8-960-097-45
For DVW-M2000P:	CR8-1A PS :	8-960-098-45
For DVW-2000:	ZR2-1:	8-960-073-11
For DVW-2000P:	ZR2-1P:	8-960-073-61

- Oscilloscope (Tektronix TDS460A or equivalent)
- Torque screwdriver (0.6 N•m) {6 kgf•cm} (JB-5251): J-6252-510-A
- Torque screwdriver's bit (+2 mm, l = 75 mm): J-6323-420-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape, and put a weight (about 1000 g) onto it.

For DVW-M2000:	CR8-1A
For DVW-M2000P:	CR8-1A PS
For DVW-2000:	ZR2-1
For DVW-2000P:	ZR2-1P

(3) Turn on the power.

2. Connect the Oscilloscope

For DVW-M2000/P:
Connect the oscilloscope as follows:
CH-1: TP100/AE-31 board (CH-1 PB)
CH-2: TP202/AE-31 board (CH-2 PB)
Oscilloscope setting:
CH-1: 200 mV/DIV
CH-2: 200 mV/DIV
TIME: 5 ms/DIV

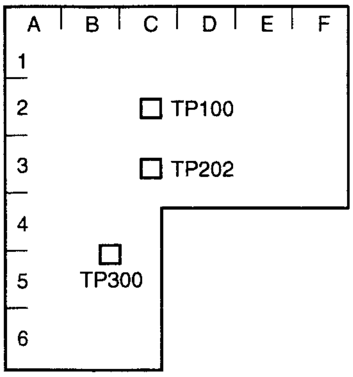
For DVW-2000/P:
CH-1: TP300/AE-31 board (CUE signal)
Oscilloscope setting:
CH-1: 200 mV/DIV
TIME: 5 ms/DIV

- Connection of the oscilloscope

For DVW-M2000/P:
CH-1 : TP100/AE-31 board (CH-1 PB signal)
CH-2 : TP202/AE-31 board (CH-2 PB signal)

For DVW-2000/P:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

3. Check the AT Head Head-to-tape Contact

For DVW-M2000/P:

(1) Play back the 10 kHz, −10 VU signal portion (3:00 to 4:55) on the CR8-1A/CR8-1A PS in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

(3) Check that both increased amount of the output levels in CH-1 and CH-2 satisfy the specification.

If the specification is not satisfied, perform following steps 4 and later.

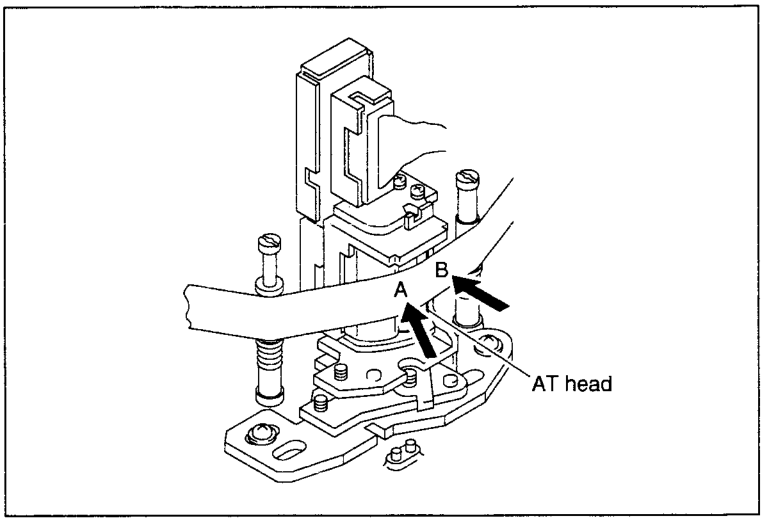
For DVW-2000/P:

(1) Play back the 12 kHz, 0 VU signal portion (15:00 to 25:00) on the ZR2-1/ZR2-1P in the PLAY mode.

(2) Slightly push portions A and B of the tape shown in the figure to increase the tape's wrapping angle against the AT head.

(3) Check that the increased amount of output level satisfies the specification.

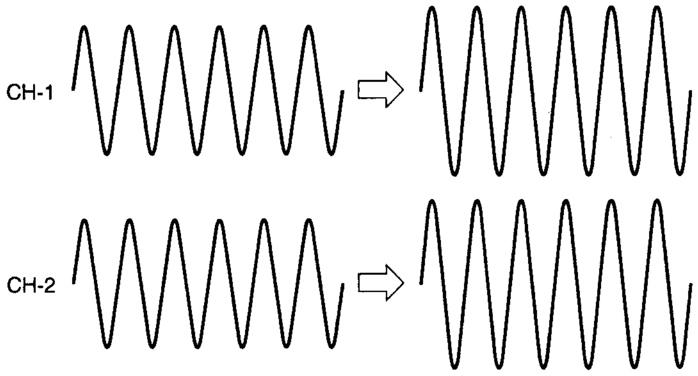
If the specification is not satisfied, perform steps 4 and later.



AT Head Head-to-tape Contact Check

- Alignment tape : CR8-1A/CR8-1A PS (3:00 to 4:55)

<AUDIO output waveform>

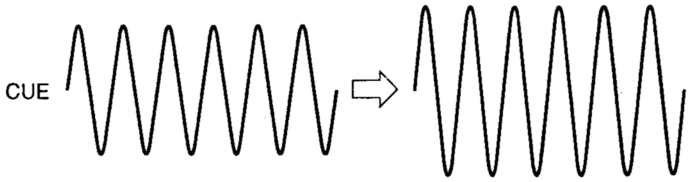


Spec. : Both increased amount of the output levels in CH-1 and CH-2 are within 5 %.

Specification for DVW-M2000/P

- Alignment tape : ZR2-1/ZR2-1P (15:00 to 25:00)

<CUE output waveform>



Spec. : Increased amount of the output level is within 5 %.

Specification for DVW-2000/P

Adjustment

4. Adjust the AT Head Head-to-tape Contact

(1) Loosen the two head securing screws by 1/4 to 1/2 turn.
(2) Insert a 2 mm flatbladed screwdriver into the notch of the adjustment plate.
(3) Adjust the AT head position to maximize the output level.
(4) Tighten the two securing screws loosened in step (1).

Tightening torque: 19.6 × 10^{-2} N•m
{2 kgf•cm}

5. Recheck the AT Head Head-to-tape Contact

Perform to previous step 3 in this section again.

After the adjustment

6. Check the AT Head Position

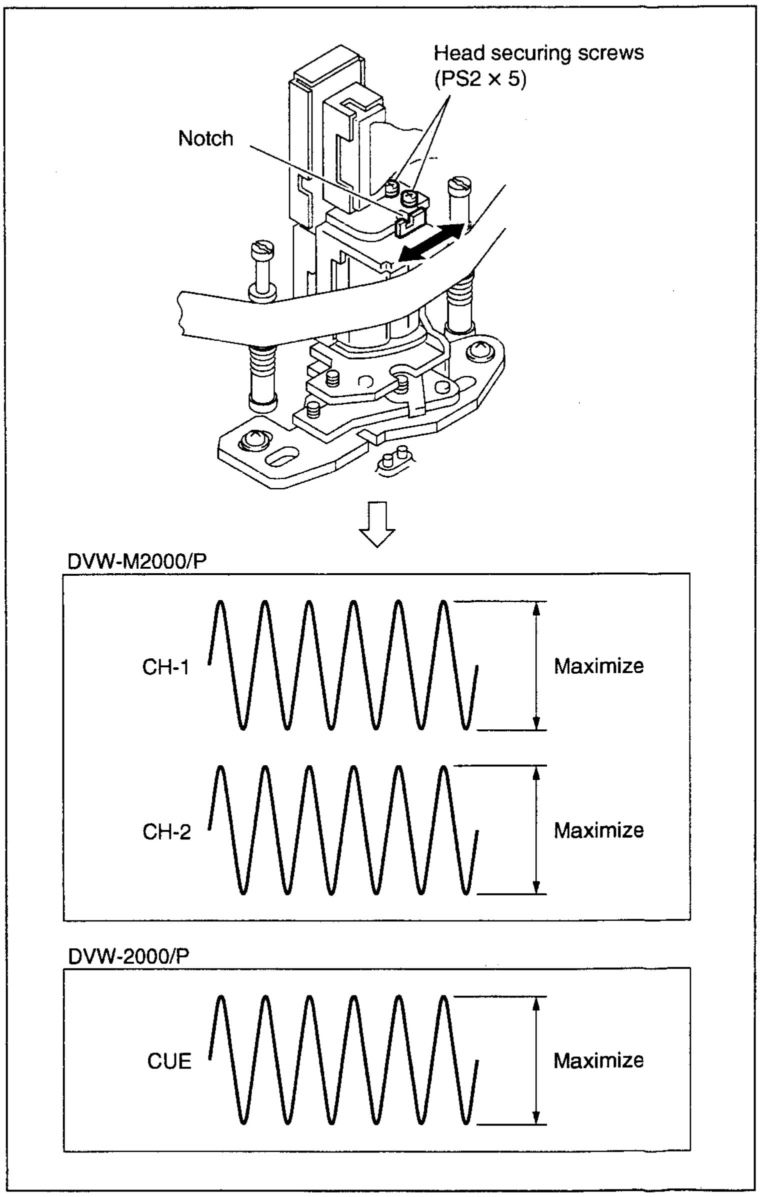
Refer to Section 6-6-10.

7. Check the AT Head Height

Refer to Section 6-6-6.

8. Check the AT Head Azimuth

For DVW-M2000/P, refer to Section 6-6-7.
For DVW-2000/P, refer to Section 6-6-8.


Head securing screws
(PS2 x 5)
Notch
DVW-M2000/P
CH-1
Maximize
CH-2
Maximize
DVW-2000/P
CUE
Maximize

AT Head Head-to-tape Contact Adjustment

6-6-10. AT Head Position Check and Adjustment

Precautions

- The CTL head position adjustment should be completed before performing this adjustment. The AT head position is adjusted relative to the CTL head position as reference.
- The AT head position adjustment is closely related to the head height adjustment, head azimuth adjustment, and head-to-tape contact adjustment. Be sure to adjust (or check) these related portions according to "After the Adjustment" in this section after adjusting the AT head position.

Tools

• Alignment tape	
ZR2-1 (for DVW-2000/M2000):	8-960-073-11
ZR2-1P (for DVW-2000P/M2000P):	8-960-073-61
• Oscilloscope (Tektronix TDS460A or equivalent)	
• Torque screwdriver (1.2 N•m) {12 kgf•cm} (JB-5252):	J-6252-520-A
• Torque screwdriver's bit (+3 mm, l = 90 mm):	J-6323-430-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.
(2) Set the alignment tape ZR2-1/ZR2-1P, and put a weight (about 1000 g) onto it.
(3) Turn on the power.

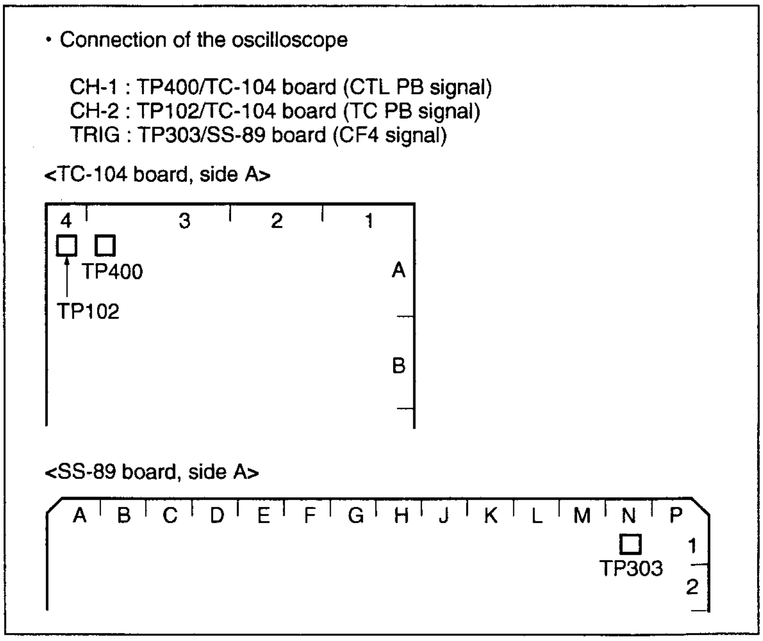
2. Connect the Oscilloscope

Connect the oscilloscope as follows:

CH-1: TP400/TC-104 board (CTL PB signal)
CH-2: TP102/TC104 board (TC PB signal)
TRIG: TP303/SS-89 board (CF4 signal)

Oscilloscope setting:

CH-1: 1 V/DIV
CH-2: 2 V/DIV
TIME: 10 ms to 500 µs/DIV



- Connection of the oscilloscope

CH-1 : TP400/TC-104 board (CTL PB signal)
CH-2 : TP102/TC-104 board (TC PB signal)
TRIG : TP303/SS-89 board (CF4 signal)

Preparation

Check

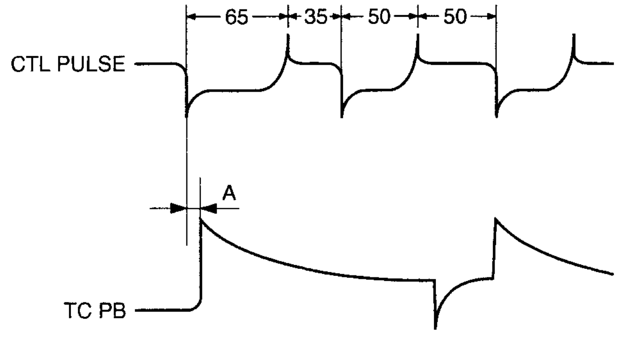
3. Check the AT Head Position

(1) Play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

(2) Check that the positional relationship between the rising edges of CTL's 65:35 pulse and TC PB's 65:35 waveform signals satisfies the specification.

If the specification is not satisfied, perform following steps 4 and later.

- Alignment tape : ZR2-1/ZR2-1P (00:00 to 15:00)



Spec. (for check) : A = 0 ±2.40 ms

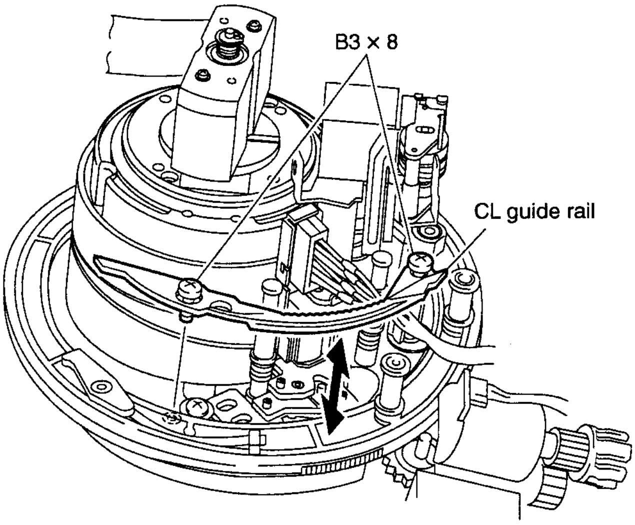
AT Head Position Check

Adjustment

4. Remove the CL Guide Rail

(1) Turn off the power.

(2) Fully loosen the two screws, then remove the CL guide rail.



CL Guide Rail Removal/Reattachment

5. Adjust the AT Head Position

(1) Loosen the two securing screws of the AT head assembly by 1/4 to 1/2 turn.

(2) Turn on the power, then play back the alignment tape ZR2-1/ZR2-1P (00:00 to 15:00) in the PLAY mode.

(3) Insert a 3 mm flatbladed screwdriver into the notch of the AT head assembly.

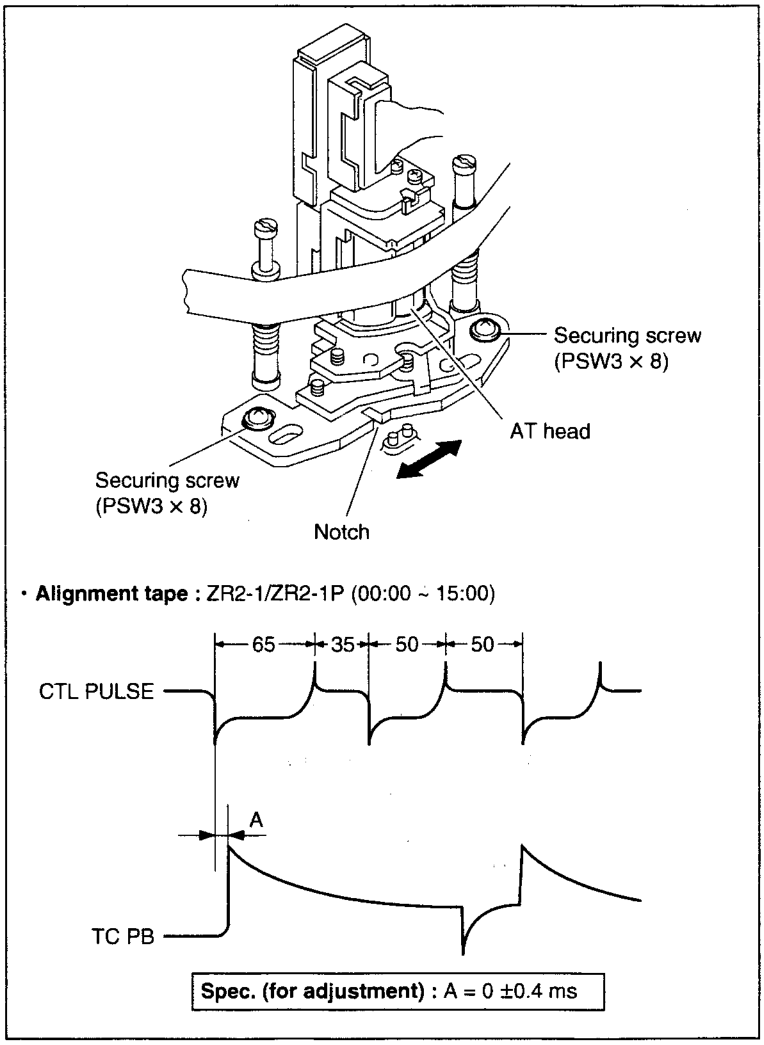
(4) Adjust the AT head assembly position so that the specification is satisfied.

Note

The specifications in AT head position check and position adjustment differ. When adjusting, apply the specification in AT head position adjustment.

(5) Tighten the two screws loosened in step (1).

Tightening torque: 98×10^{-2} N•m
{10.0 kgf•cm}



• **Alignment tape** : ZR2-1/ZR2-1P (00:00 ~ 15:00)

Spec. (for adjustment) : A = 0 ±0.4 ms

AT Head Position Adjustment

6. Recheck the AT Head Position

Perform previous step 3 in this section again.

7. Attach the CL Guide Rail

(1) Turn off the power, then remove the alignment tape.

(2) Attach the CL guide rail with two screws.

After the Adjustment

8. Check the AT Head Height

Refer to Section 6-6-6.

9. Check the AT Head Azimuth

For DVW-M2000/P, refer to Section 6-6-7.
For DVW-2000/P, refer to Section 6-6-8.

10. Check the AT Head Head-to-tape Contact

Refer to Section 6-6-9.

11. Check the AT Head Position

Refer to step 3 in this section.

12. Apply the Locking Compound

Refer to Section 6-1-9.

6-6-11. Audio/CUE Level Check and Adjustment in REV Mode

Tools

- Alignment tape

For DVW-M2000:	CR8-1A :	8-960-097-45
For DVW-M2000P:	CR8-1A PS:	8-960-098-45
For DVW-2000:	ZR2-1:	8-960-073-11
For DVW-2000P:	ZR2-1P:	8-960-073-61

- Oscilloscope (Tektronix TDS460A or equivalent)
- Adjustment mirror (circular): J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A

Preparation

1. Set the Alignment Tape

(1) Turn off the power.

(2) Set the alignment tape and put a weight (about 1000 g) onto it.

For DVW-M2000:	CR8-1A
For DVW-M2000P:	CR8-1A PS
For DVW-2000:	ZR2-1
For DVW-2000P:	ZR2-1P

(3) Turn on the power.

2. Connect the Oscilloscope

Connect the oscilloscope as follows:

For DVW-M2000/P:

CH-1: TP202/AE-31 board (CH-2 PB)

Oscilloscope setting:

CH-1: 200 mV/DIV

TIME: 5 ms/DIV

For DVW-20000/P:

CH-1: TP300/AE-31 board (CUE signal)

Oscilloscope setting:

CH-1: 200 mV/DIV

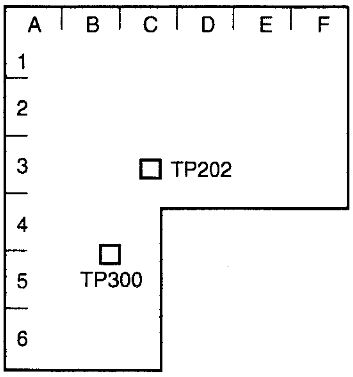
TIME: 5 ms/DIV

- Connection of the oscilloscope

For DVW-M2000/P:
CH-1 : TP202/AE-31 board (CH-2 PB signal)

For DVW-2000/P:
CH-1 : TP300/AE-31 board (CUE signal)

<AE-31 board, side A>



Preparation

Check

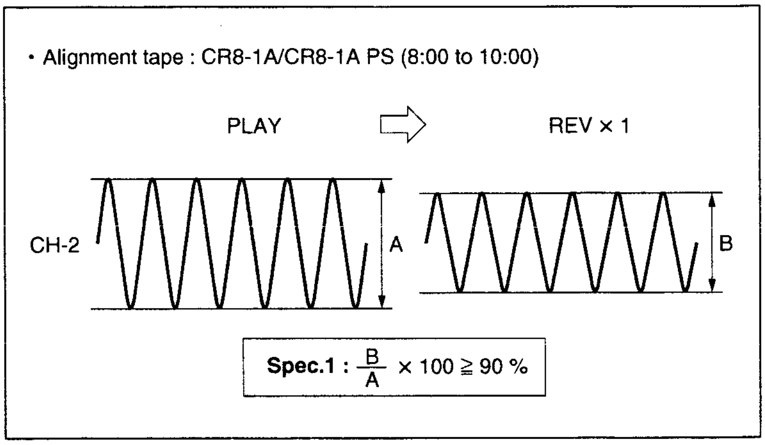
3. Check the Audio Output Level

Note

This step is for DVW-M2000/P.

(1) Play back the 1 kHz, 0 VU signal portion (8:00 to 10:00) on the CR8-1A/CR8-1A PS.
(2) Check the audio output level A in CH-2.
(3) Set the REV × 1 mode.
(4) Check that the audio output level B in CH-2 satisfies specification 1.

If specification 1 is not satisfied, perform following steps 5 and later.


• Alignment tape : CR8-1A/CR8-1A PS (8:00 to 10:00)
PLAY
REV x 1
CH-2
A
B
Spec.1 : B/A x 100 ≧ 90 %

Audio Level Check in REV Mode (DVW-M2000/P)

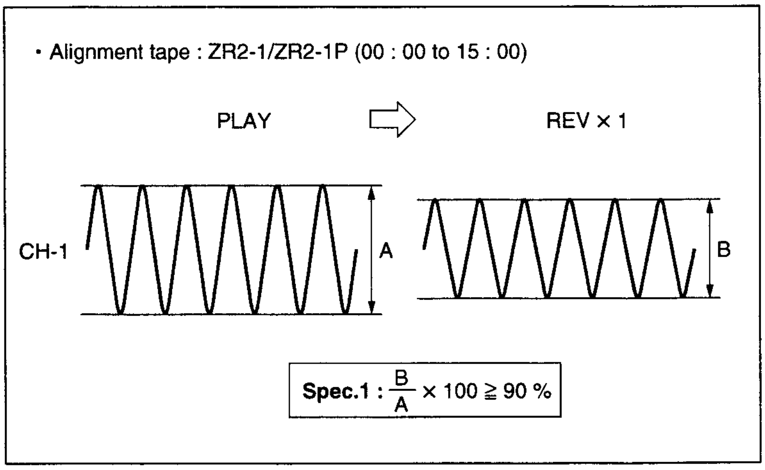
4. Check the CUE Output Level

Note

This step is for the DVW-2000/P.

(1) Play back the 1 kHz, 0 VU signal portion (00:00 to 15:00) on the HR2-1A in the PLAY mode.
(2) Check the CUE output level A.
(3) Set the REV × 1 mode.
(4) Check that the CUE output level B satisfies the specification 1.

If specification 1 is not satisfied, perform following steps 5 and later.


• Alignment tape : ZR2-1/ZR2-1P (00 : 00 to 15 : 00)
PLAY
REV x 1
CH-1
A
B
Spec.1 : B/A x 100 ≧ 90 %

CUE Level Check in REV Mode (DVW-2000/P)

Adjustment

5. Adjust the TG-5 (Threading Roller) Height

(1) Play back the 1 kHz, 0 VU signal portion on the alignment tape.

For DVW-M2000:	CR8-1A (8:00 to 10:00)
For DVW-M2000P:	CR8-1A PS (8:00 to 10:00)
For DVW-2000:	ZR2-1 (00:00 to 15:00)
For DVW-2000P:	ZR2-1P (00:00 to 15:00)

(2) Set the REV × 1 mode.

(3) Slightly press down the portion A of the tape shown in figure, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 clockwise using a tape guide adjustment driver.

(4) Slightly push up the portion B of the tape, and check to see that the output level is not increased.
If the level is increased, press the EJECT button to unthread the tape, and then turn the upper flange of TG-5 counterclockwise using the tape guide adjustment driver.

(5) Check the output level satisfies specification 1 (previous page).

If the specification 1 is not satisfied, repeat steps (1) through (4) mentioned above.

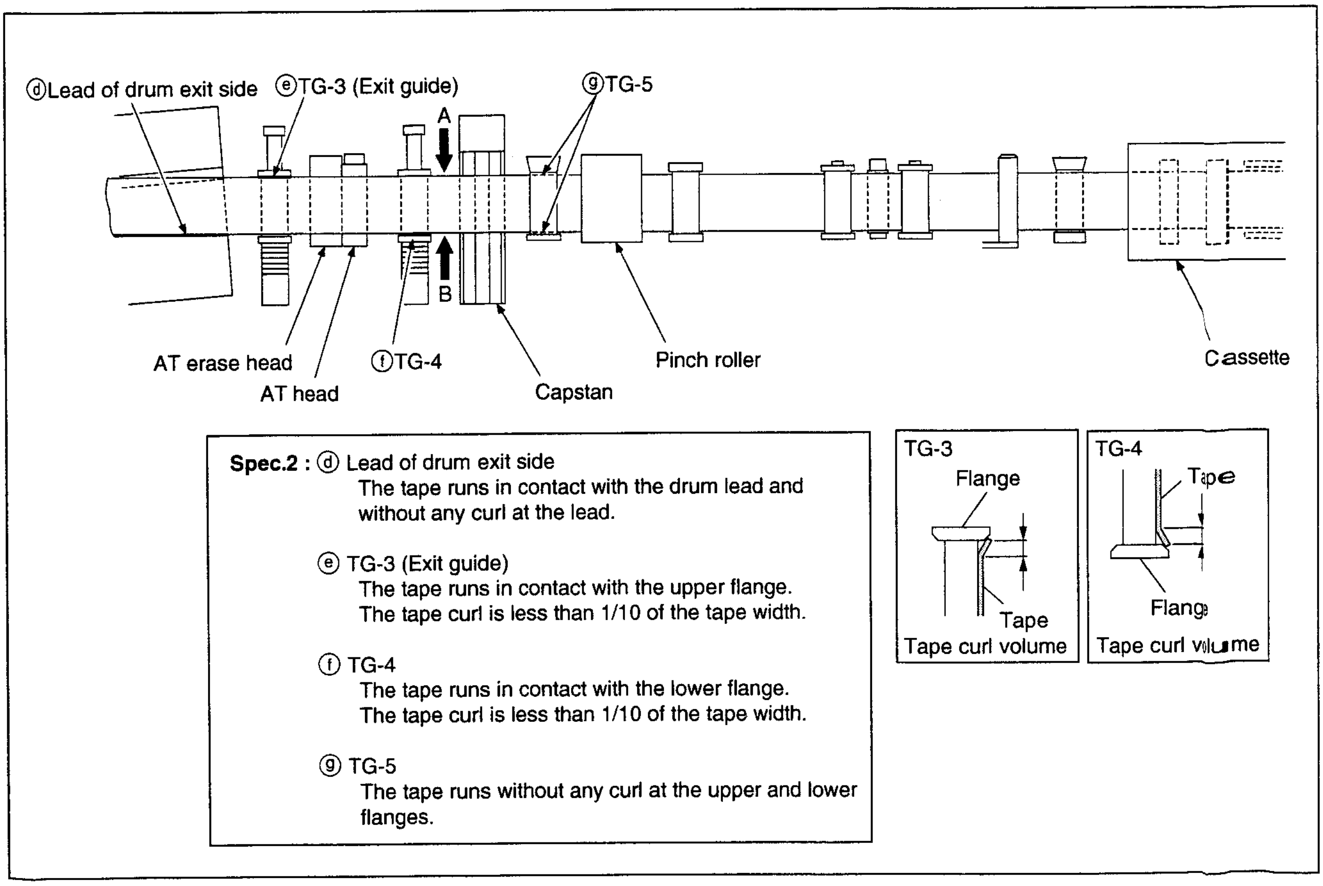
6. Check the Tape-running at Tape Exit Side

In the following modes, check that the tape-running condition satisfies specification 2.

- PLAY mode
- REV × 1 mode

If specification 2 is not satisfied, adjust the tape guides height at the tape exit side. (Refer to step 7 (at the Tape Exit Side) in Section 6-7-2.)

If the height of the tape guide is adjusted, perfom the video tracking check.
(Refer to Section 6-6-1.)



Spec.2 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

ⓖ TG-5
The tape runs without any curl at the upper and lower flanges.

Audio/CUE Level Adjustment in REV Mode

6-7. Tape Running Check and Adjustment

6-7-1. Tape Entrance Side

Tools

• S cassette	
For HDW series: HDCAM cassette:	BCT-40HD
For DVW series: Digital Betacam cassette:	BCT-D40
For MSW series: MPEG IMX cassette:	BCT-60MX
• Small dental mirror:	J-6080-029-A
• Tape guide adjustment driver (MW-261):	J-6322-610-A

Check

1. Set the S Cassette Tape

(1) Press the switch S300 on the SS-89 board to set the reel tables to the S cassette position. (Refer to Section 5-1-3.)

(2) Turn off the power.

(3) Set the S cassette and put a weight (about 1000 g) onto it.

(4) Turn on the power.

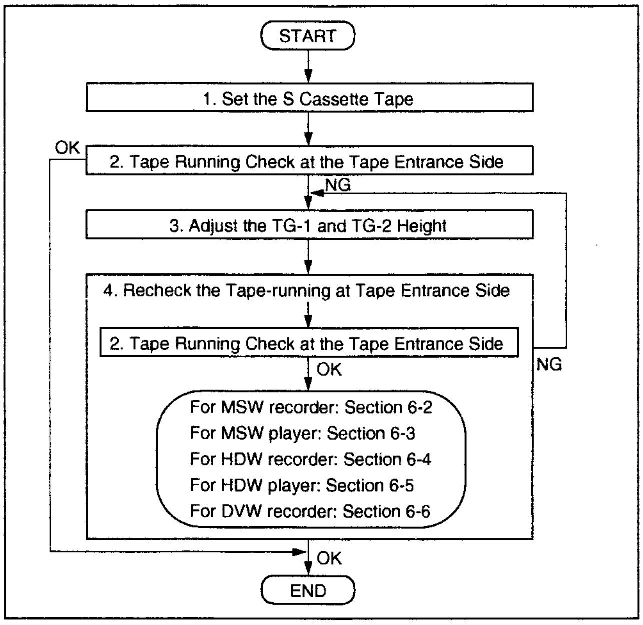
2. Tape Running Check at the Tape Entrance Side

(1) In the PLAY mode, check that the tape-running condition satisfies specification 1.

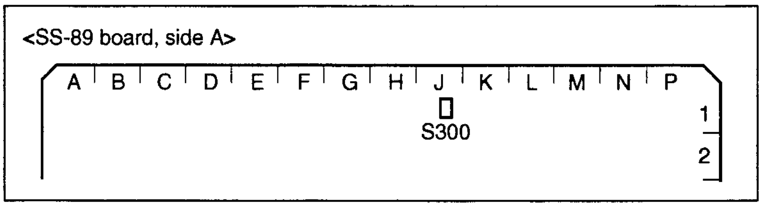
If specification 1 is not satisfied, perform steps 3 and 4.

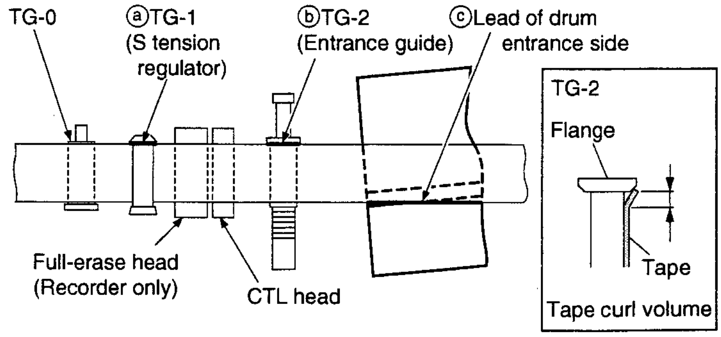
(2) In the REV × 1 mode, check that the tape-running condition satisfies specification 2.

If specification 2 is not satisfied, perform steps 3 and 4.


START
1. Set the S Cassette Tape
OK
2. Tape Running Check at the Tape Entrance Side
NG
3. Adjust the TG-1 and TG-2 Height
4. Recheck the Tape-running at Tape Entrance Side
2. Tape Running Check at the Tape Entrance Side
OK
NG
For MSW recorder: Section 6-2
For MSW player: Section 6-3
For HDW recorder: Section 6-4
For HDW player: Section 6-5
For DVW recorder: Section 6-6
OK
END

Flow Chart of Tape-running Check at Tape Entrance Side


<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
S300


TG-0
ⓐTG-1
(S tension regulator)
ⓑTG-2
(Entrance guide)
ⓒLead of drum entrance side
Full-erase head
(Recorder only)
CTL head
TG-2
Flange
Tape
Tape curl volume

Spec.1: ⓐ TG-1 (S tension regulator)
The tape runs in contact with the upper flange.

ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Spec.2: ⓑ TG-2 (Entrance guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓒ Lead of drum entrance side
The tape runs in contact with the drum lead and without any curl at the lead.

Tape-running Check at Tape Entrance Side

Adjustment

3. Adjust the TG-1 and TG-2 Height

(1) Run the S cassette tape in the PLAY mode.

(2) Turn the height adjustment nuts of TG-1 and TG-2 using a tape guide adjustment driver and adjust the height of TG-1 and TG-2 so that the specification 1 (previous page) is satisfied.

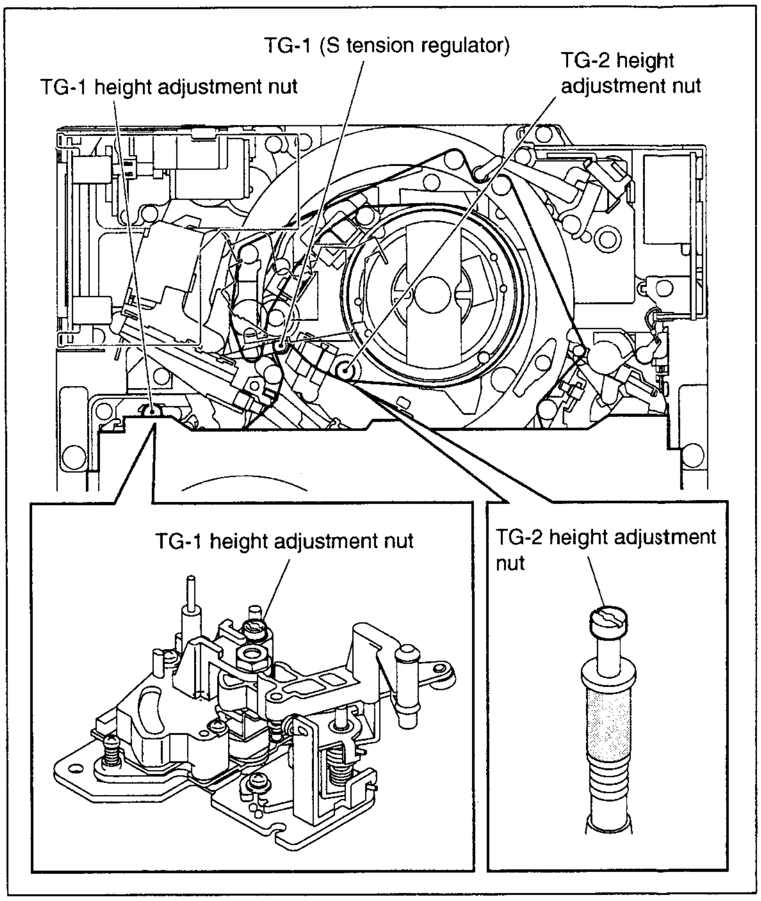
Note

Do not rotate screws other than the height adjustment nut. Otherwise this may result in abnormal tape-running or tape tension.

4. Recheck the Tape-running at Tape Entrance Side

Perform step 2 and the video tracking check (Refer to any section of Sections 6-2 through 6-6.)

If the specification 1 and 2 on the previous page is not still satisfied, perform the adjustment in step 3 again.

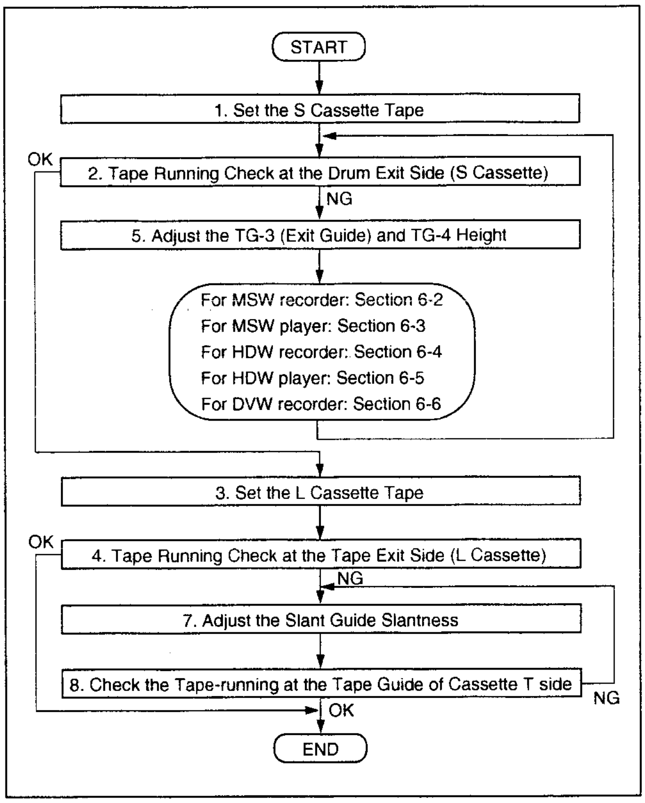

TG-1 (S tension regulator)
TG-1 height adjustment nut
TG-2 height adjustment nut
TG-1 height adjustment nut
TG-2 height adjustment nut

TG-1 and TG-2 Height Adjustment

6-7-2. Tape Exit Side

Tools

• S cassette	
For HDW series: HDCAM cassette:	BCT-40HD
For DVW series: Digital Betacam cassette:	BCT-D40
For MSW series: MPEG IMX cassette:	BCT-60MX
• L cassette	
For HDW series: HDCAM cassette:	BCT-124HDL
For DVW series: Digital Betacam cassette:	BCT-D124L
For MSW series: MPEG IMX cassette:	BCT-184MXL
• Small dental mirror:	J-6080-029-A
• Tape guide adjustment driver (MW-261):	J-6322-610-A


START
1. Set the S Cassette Tape
OK
2. Tape Running Check at the Drum Exit Side (S Cassette)
NG
5. Adjust the TG-3 (Exit Guide) and TG-4 Height
For MSW recorder: Section 6-2
For MSW player: Section 6-3
For HDW recorder: Section 6-4
For HDW player: Section 6-5
For DVW recorder: Section 6-6
3. Set the L Cassette Tape
OK
4. Tape Running Check at the Tape Exit Side (L Cassette)
NG
7. Adjust the Slant Guide Slantness
8. Check the Tape-running at the Tape Guide of Cassette T side
NG
OK
END

Flow Chart of Tape-running Check at Tape Exit Side

Check

1. Set the S Cassette Tape

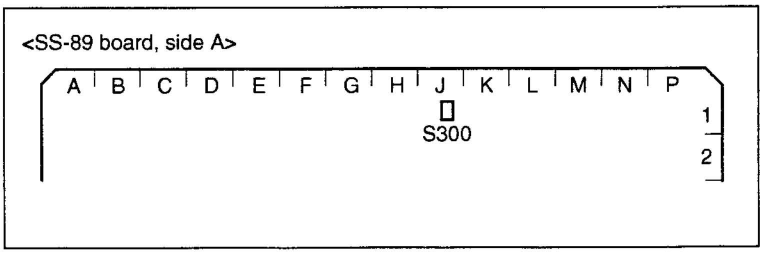
(1) Turn on the power.

(2) Press the switch S300 on the SS-89 board to set the reel tables to the S cassette position.

(3) Turn off the power.

(4) Set the S cassette and put a weight (about 1000 g) onto it.

(5) Turn on the power.


<SS-89 board, side A>
A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
S300

2. Tape Running Check at the Drum Exit Side (S Cassette)

(1) In the PLAY mode, check that the tape-running condition satisfies specification 3.

If specification 3 is not satisfied, perform steps 5 and 6.

(2) In the REV × 1 mode, check that the tape-running condition satisfies specification 3.

If specification 3 is not satisfied, perform steps 5 and 6.

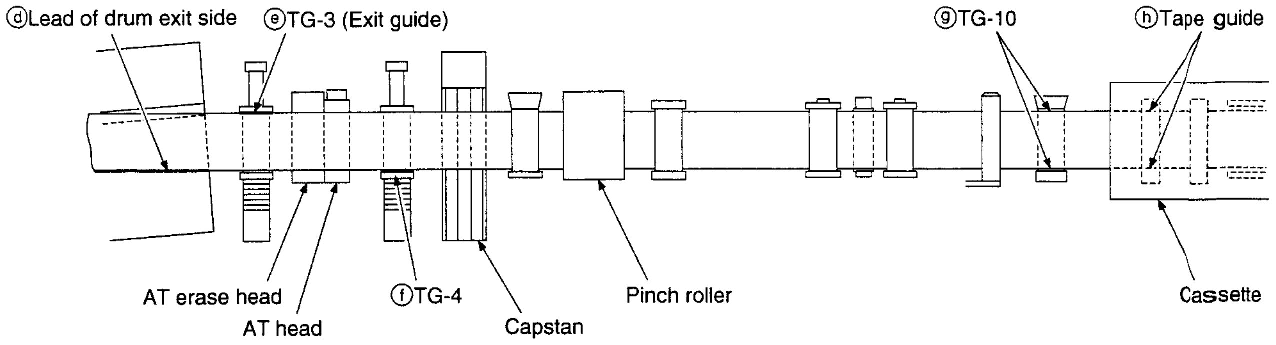
3. Set the L Cassette Tape

(1) Turn off the power, then remove the S cassette.
(2) Turn on the power.
(3) Press the switch S300 on the SS-89 board to set the reel tables to the L cassette position.
(4) Turn off the power.
(5) Set the L cassette and put a weight (about 1000 g) onto it.
(6) Turn on the power.

4. Tape Running Check at the Tape Exit Side (L Cassette)

(1) Run the tape beginning portion of the L cassette in the PLAY mode.
(2) Check that the tape-running condition satisfies specification 4.

If specification 4 is not satisfied, perform step 7.


ⓓLead of drum exit side
ⓔTG-3 (Exit guide)
ⓖTG-10
ⓗTape guide
AT erase head
AT head
ⓕTG-4
Capstan
Pinch roller
Cassette

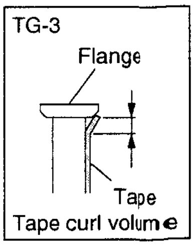
Spec.3 : ⓓ Lead of drum exit side
The tape runs in contact with the drum lead and without any curl at the lead.

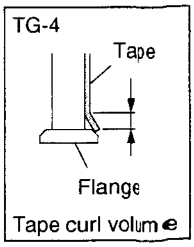
ⓔ TG-3 (Exit guide)
The tape runs in contact with the upper flange.
The tape curl is less than 1/10 of the tape width.

ⓕ TG-4
The tape runs in contact with the lower flange.
The tape curl is less than 1/10 of the tape width.

Spec.4 : Play mode
ⓖ TG-10
The tape runs not in contact with the upper and lower flanges.

ⓗ Take-up side tape guide of cassette
The tape runs without any curl at the upper and lower portions of the tape guide.


TG-3
Flange
Tape
Tape curl volume


TG-4
Tape
Flange
Tape curl volume

Tape-running Check at Drum Exit Side

Adjustment

5. Adjust the TG-3 (Exit Guide) and TG-4 Height

(1) Run the S cassette tape in the PLAY mode.

(2) Turn the height adjustment nuts of TG-3 and TG-4 using a tape guide adjustment driver and adjust the height of TG-3 and TG-4 so that the specification 3 (previous page) is satisfied.

(3) Perform the video tracking adjustment (Refer to any section of Sections 6-2 through 6-6).

6. Recheck the Tape-running at Tape Exit Side

Perform step 2 again.
If the specification 3 is not still satisfied, perform the adjustment in step 5 again.

7. Adjust the Slant Guide Slantness

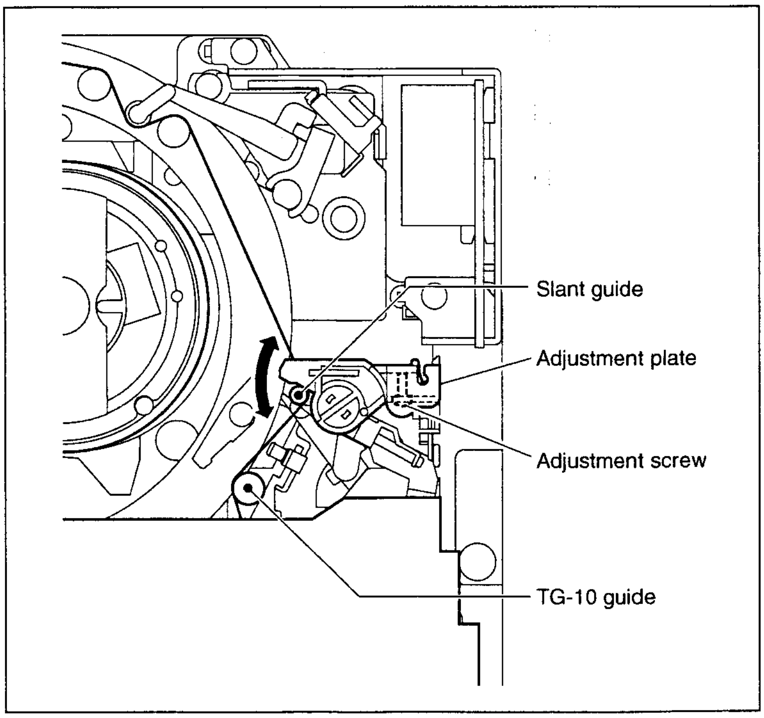
The T drawer assembly (RP) including the slant guide is adjusted precisely at shipment. (The slantness of the slant guide is also center-adjusted.)
If specification 4 (previous page) is not satisfied, re-check the followings before adjusting the slantness.

- The L cassette used for checking is normal condition.
- The T drawer assembly is attached properly.
- The results of other tape-running checks are within each specification.

Adjustment

Rotate the adjustment screw of the T drawer assembly, and adjust the position of the adjustment plate so that specification 4 is satisfied.

- If the tape is touching the upper flange of the TG-10 guide, rotate the adjustment screw counterclockwise.
- If the tape is touching the lower flange of the TG-10 guide, rotate the adjustment screw clockwise.



Slant Guide Slantness Adjustment

8. Check the Tape-running at the Tape Guide of Cassette T side

(1) Press the STOP button to set the unthreading end mode.

(2) In the PLAY mode, check that the tape satisfies specification 4 (previous page) when running at the TG-10 guide.

If specification 4 is not satisfied, repeat steps 7 and 8 above.

6-8. PB Head Head-to-tape Contact Check

Precautions

- This check should be performed when specifications have not been satisfied in "7-2-6. PB Equalizer Automatic Adjustment".
- The check of each PB head for Betacam SX, Digital Betacam, or MPEG IMX is possible.

Tools

- Oscilloscope (Tektronix TDS460A or equivalent)
- Small dental mirror: J-6080-029-A
- Tape guide adjustment driver (MW-261): J-6322-610-A
- Alignment tapes

For Digital Betacam	ZR5-1 (for 525):	8-960-073-01
	ZR5-1P (for 625):	8-960-073-51
For MPEG IMX	MR5-1 (for 525):	8-960-077-01
	MR5-1P (for 625):	8-960-077-51
For Betacam SX	SR5-1 (for 525):	8-960-075-01
	SR5-1P (for 625):	8-960-075-51

1. Check the Betacam SX Playback Head Contact

Note

This step is not required for HDW-2000/D2000 and DVW-2000/P.

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)
Oscilloscope setting:
CH-1: 200 to 500 mV/DIV
TRIG: 5 V/DIV
TIME: 2 to 5 ms/DIV

(2) Set Bit-1 of the DIP switch S101 on the SS-89 board to ON (pushed up) to enable the tracking control.

(3) Set the SR5-1/SR5-1P, and then put a weight (about 1000 g) onto it.

(4) Turn on the power, then set F1 (CAPSTN) of function menu Page 4 to 4F.
(Customer setting: ☐2F ☐4F ☐8F)

(5) Play back the SR5-1/SR5-1P in the PLAY mode.

(6) Rotate the tracking VR (RV300/SS-89 board) to maximize the output level at the center of the RF waveform of the A1 channel.

(7) Next, set the output level of the RF waveform of the A5 channel to maximum with the tracking VR, and check that the RF envelope signal of A1 and A5 channels is output.

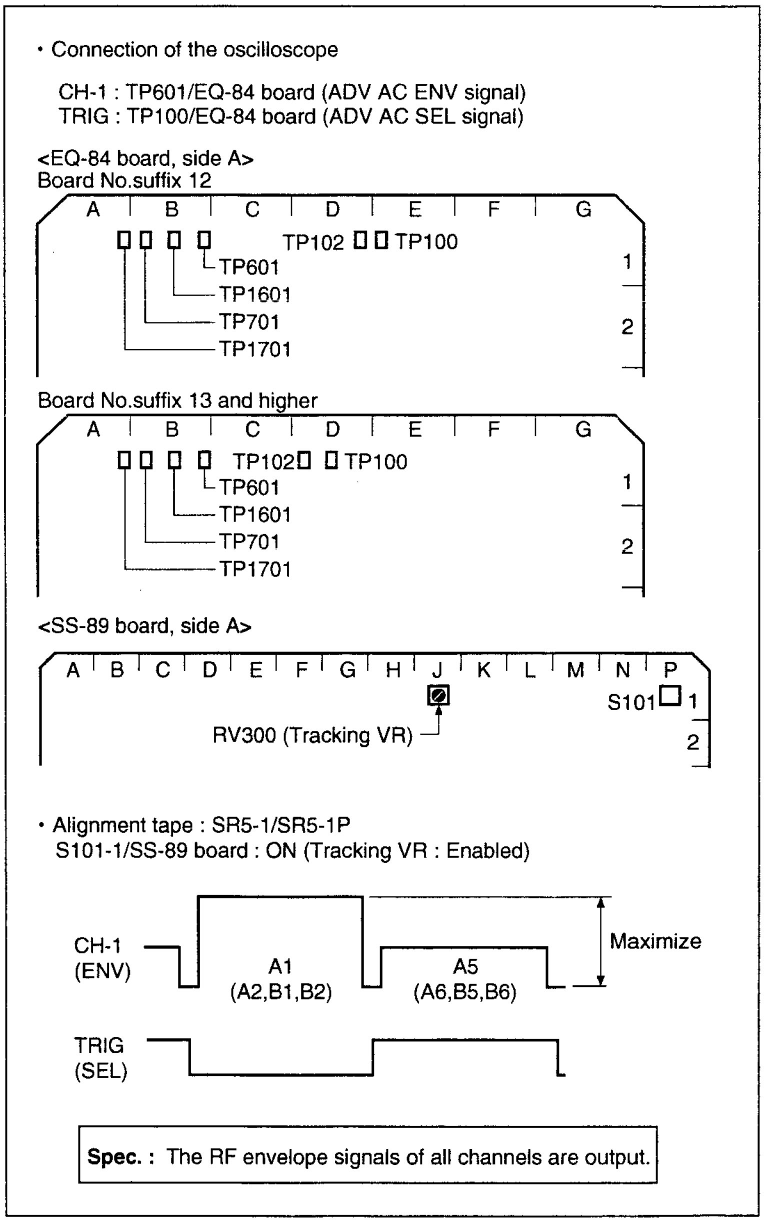
(8) Change the connections of CH-1 and CH-2 of the oscilloscope as follows, and then repeat steps (4) to (7).
- CH-1: TP1601, TRIG: TP100
- CH-1: TP701, TRIG: TP102
- CH-1: TP1701, TRIG: TP102

(All these TPs are on the EQ-84 board.)

Note

The actual signals output from the TPs are as follows:

TP100 (A1A5 SEL signal)
TP102 (A2A6 SEL signal)
TP601 (A1A5 ENV signal)
TP701 (A2A6 ENV signal)
TP1601 (B1B5 ENV signal)
TP1701 (B2B6 ENV signal)


• Connection of the oscilloscope
CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)
<EQ-84 board, side A>
Board No.suffix 12
A B C D E F G
TP102 TP100
TP601
TP1601
TP701
TP1701
1
2
Board No.suffix 13 and higher
A B C D E F G
TP102 TP100
TP601
TP1601
TP701
TP1701
1
2
<SS-89 board, side A>
A B C D E F G H J K L M N P
S101 1
2
RV300 (Tracking VR)
• Alignment tape : SR5-1/SR5-1P
S101-1/SS-89 board : ON (Tracking VR : Enabled)
CH-1 (ENV)
A1 (A2,B1,B2)
A5 (A6,B5,B6)
Maximize
TRIG (SEL)

Spec.: The RF envelope signals of all channels are output.

Betacam SX Playback Head Contact Check

(9) Return F1 (CAPSTN) of function menu Page 4 to the customer setting.

(10) Turn off the power, then remove the SR5-1/SR5-1P.

(11) Set Bit-1 of the DIP switch S101 on the SS-89 board to OFF (pushed down).

2. Check the Digital Betacam Playback Head Contact

Note

This step is not required for MSW-2000, MSW-A2000/P, HDW-2000 and HDW-S2000/P.

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)

(2) Set the ZR5-1/ZR5-1P, and then put a weight (about 1000 g) onto it.

(3) Turn on the power, then set F1 (CAPSTN) of function menu Page 4 to 4F.
(Customer setting: ☐2F ☐ 4F ☐ 8F)

(4) Play back the ZR5-1/ZR5-1P in the PLAY mode.

(5) Check that each channel envelope waveform of ADV AC ENV and ADV BD ENV is output.

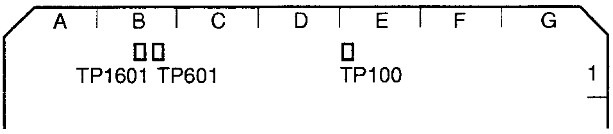
(6) Return F1 (CAPSTN) of function menu Page 4 to customer setting.

(7) Turn off the power, then remove the ZR5-1/ZR5-1P.

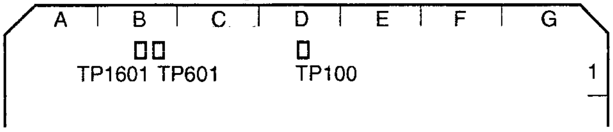
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

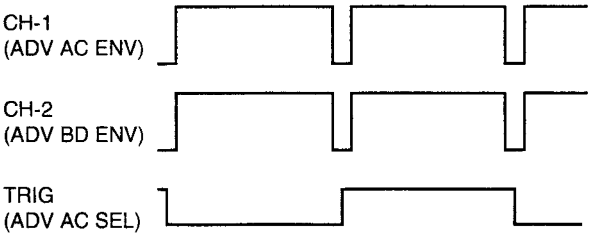
<EQ-84 board, side A>
Board No.suffix 12



Board No.suffix 13 and higher



- Alignment tape : ZR5-1/ZR5-1P
S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec. : The RF envelope waveform is output.

Digital Betacam Playback Head Contact Check

3. Check the MPEG IMX Playback Head Contact

Note

This step is not required for HDW-2000, HDW-S2000/P and DVW-2000/P.

(1) Connect the oscilloscope as follows:
CH-1: TP601/EQ-84 board
(ADV AC ENV signal)
CH-2: TP1601/ EQ-84 board
(ADV BD ENV signal)
TRIG: TP100/ EQ-84 board
(ADV AC SEL signal)

(2) Set the MR5-1/MR5-1P, and then put a weight (about 1000 g) onto it.

(3) Turn on the power, then set F1 (CAPSTN) of function menu Page 4 to 4F.
(Customer setting: ☐2F ☐ 4F ☐ 8F)

(4) Play back the MR5-1/MR5-1P in the PLAY mode.

(5) Check that each channel envelope waveform of ADV AC ENV and ADV BD ENV is output.

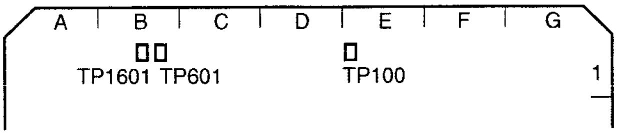
(6) Return F1 (CAPSTN) of function menu Page 4 to customer setting.

(7) Turn off the power, then remove the MR5-1/ MR5-1P.

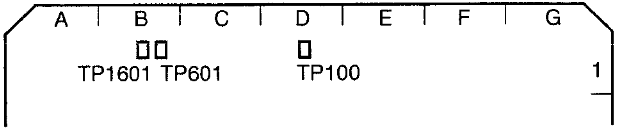
- Connection of the oscilloscope

CH-1 : TP601/EQ-84 board (ADV AC ENV signal)
CH-2 : TP1601/EQ-84 board (ADV BD ENV signal)
TRIG : TP100/EQ-84 board (ADV AC SEL signal)

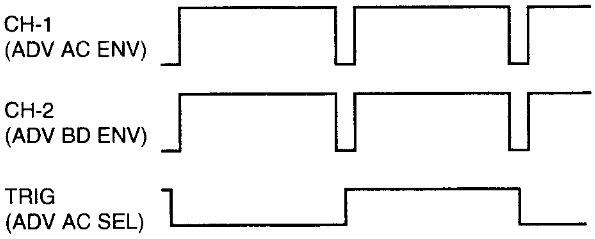
<EQ-84 board, side A>
Board No.suffix 12



Board No.suffix 13 and higher



- Alignment tape : MR5-1/MR5-1P
S101-1/SS-89 board : OFF (Tracking VR : Disabled)



Spec. : The RF envelope waveform is output.

MPEG IMX Playback Head Contact Check

Section 7

Electrical Alignment after Main Parts Replacement

7-1. Electrical Alignment Overview

7-1-1. Precautions

- Section 7 requires that Section 6 "Tape Path Alignment" has been completed.
- Some items in this section require to perform adjustment in both the standard mode and the alternative mode. Switch the mode with ITEM-013 of the setup menu as necessary.

NTSC model:	Standard mode:	525 or 59.94 Hz
	Alternative mode:	625 or 50 Hz
PAL model:	Standard mode:	625 or 50 Hz
	Alternative mode:	525 or 59.94 Hz

- Be sure to perform the adjustment in order.
- Do not contact with adjusting part when other than required.
- Do not execute automatic adjustment, and do not change adjustment data when other than required.
  In case either of these is done unintentionally, do not save the data. To recover it, turn off the power of the VTR or execute "ALL DATA PREVIOUS" in each NV-RAM control menu so as not to save the data.

  Note

  As for the servo and DT systems, the function of "ALL DATA PREVIOUS" is not included in the NV-RAM control menu.
  In case the automatic adjustment is executed unintentionally, be sure to turn off the power of the VTR.
- For details on the maintenance mode, refer to Section 3.
- Before beginning adjustment, it is recommended to note the customer conditions. The settings can be easily returned to its customer condition after finishing adjustment.
  - Settings of hardware and F-menu:
    - Use the setting check sheets.
    - (Refer to the installation manual.)
  - Settings of the setup menu:
    - Use a Memory Stick or memory card. (Refer to "1-27. Memory Stick (or Memory Card)".)

7-1-2. Outline of Electrical Alignment

In Section 7 explains the electrical alignment after replacing the following parts:

- Drum assembly / Upper drum assembly .... Section 7-2
- AT head .... Section 7-3

7-1-3. How to Change the Data

The change of the data in the maintenance mode is as follows:

1. Turn the MULTI CONTROL knob to align asterisk cursor (*) with the desired item on the video monitor and display the abbreviated title of the item in the menu display area of the VTR.
2. To change the data, turn the MULTI CONTROL knob while pressing the HOME button.

7-1-4. How to Eject the Cassette Tape (Analog Betacam Playback-capable Models Only)

Pressing the EJECT button while starting menu A3x or A4x of the maintenance mode will not eject the cassette tape. Eject using the following method.

1. Press the F5 (SET) button once when a direction to eject has appeared.
   - A white square appears in the right corner of the superimposed screen of the video monitor to show that the cassette is possible to eject.
2. Press the EJECT button to eject the cassette tape.
3. Press the F6 (EXIT) button once.
   - The white square on the video monitor will disappear.

Note

In this description it is supplemented as "F5 ⇨ EJECT ⇨ F6".

7-2. Electrical Adjustment after Replacing the Drum

7-2-1. Adjustment Overview

After replacing the drum assembly or upper drum assembly, perform the adjustments in Section 7-2.

Note

Before adjusting, attach the upper lid (front) assembly. When other than extending the plug-in board, also attach the upper lid (rear) assembly.

Tools

The following equipment (or equivalent) and fixtures are required:

	HDW-					DVW-		MSW-			
Tools Type	2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P M2000E M2000EP	M2100 M2100P M2100E M2100EP
Analog composite video signal generator Tektronix TSG-130A	—	—	N	N	N	—	N	—	N	N	N
Tektronix TSG-131A	—	—	P	P	P	—	P	—	P	P	P
Analog component waveform monitor Tektronix WFM300A	—	—	○	○	○	—	○	—	○	○	○
Oscilloscope Tektronix TDS460A	○	○	○	○	○	○	○	○	○	○	○
Spectrum analyzer Advantest R3261A	—	—	○	○	○	—	○	—	○	○	○
Analog composite monitor *1	○	○	○	○	○	○	○	○	○	○	○
Extension board EX-739	○	○	○	○	○	○	○	○	○	○	○
Alignment tapes HR2-1A	○	○	○	○	—	—	—	—	—	—	—
HR5-1A	○	○	○	○	○	—	—	—	—	—	—
ZR2-1	—	—	—	—	—	N	N	—	—	—	—
ZR2-1P	—	—	—	—	—	P	P	—	—	—	—
ZR5-1	—	○	○	—	○	N	N	—	—	○	○
ZR5-1P	—	○	○	—	○	P	P	—	—	○	○
MR2-1P	—	—	—	—	—	—	—	○	○	○	—
MR5-1	—	○	○	—	○	—	N	○	○	○	○
MR5-1P	—	○	○	—	○	—	P	○	○	○	○
SR5-1	—	—	○	○	○	—	N	○	○	○	○
SR5-1P	—	—	○	○	○	—	P	○	○	○	○
CR5-1B	—	—	○	○	○	—	N	—	○	○	○
CR5-1B PS	—	—	○	○	○	—	P	—	○	○	○
CR5-2A	—	—	○	○	○	—	N	—	○	○	○
CR5-2A PS	—	—	○	○	○	—	P	—	○	○	○
Recording tapes *2 Sony BCT-HD	○	○	○	○	—	—	—	—	—	—	—
Sony BCT-D	—	—	—	—	—	○	○	—	—	—	—
Sony BCT-MX	—	—	—	—	—	—	—	○	○	○	—
75 Ω terminator (5 pcs)	—	—	○	○	○	○	○	—	○	○	○

○: Required N: Required for NTSC model P: Required for PAL model —: Not required

*1 : The analog composite video monitor is used for menu displaying.
Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

*2 : Use a blank tape erased using a tape eraser in advance or a new blank tape for the RF system alignment.

Adjustments

Notes

- The adjustment of Section 7-2-7 is not required for the player.
- The adjustments of Section 7-2-8 and later are not necessary for the HDW-2000/D2000, DVW-2000/P and MSW-2000.
- In Section 7-2-6, perform required adjustment according to the digital format that is practicable to play back in this unit.
- In Section 7-2-7, perform required adjustments according to the digital format that is practicable to record in this unit.

No.	Item	Adjustment point			Remarks
7-2-3	Drum phase adjustment		A00B : RF SWITCHING POS.		(Automatic adjustment)
		Data saving	A00F : NV-RAM CONTROL		
7-2-4	SAT signal level check (for Recorder only)				
7-2-5	Digital DT system adjustment		A011 : DIGITAL DT ADJUST		(Automatic adjustment)
		Data saving	A01F : NV-RAM CONTROL		
7-2-6	PB equalizer adjustment	HDCAM	A131 : EQUALIZER	(For HDW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
		Digital Betacam	A121 : EQUALIZER	(For HDW-D/M, DVW, MSW-M series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
		MPEG IMX	A111 : EQUALIZER	For HDW-D/M, DVW-M, MSW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
		Betacam SX	A101 : EQUALIZER	(For HDW-M/S, DVW-M, MSW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
7-2-7	Recording current adjustment (for Recorder only)	HDCAM	A132 : REC CURRENT	(For HDW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
		Digital Betacam	A122 : REC CURRENT	(For DVW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
		MPEG IMX	A112 : REC CURRENT	(For MSW series)	(Automatic adjustment)
		Data saving	A1F : NV-RAM CONTROL		
7-2-8	Analog DT system automatic adjustment (Analog Betacam)		A010 : ANALOG DT ADJUST		(Automatic adjustment)
		Data saving	A01F : NV-RAM CONTROL		
7-2-9	EQ RF output level adjustment (Analog Betacam)	METAL Y	A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-A A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-B		TP101/DM-123
		METAL C	A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-A A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-B		TP301/DM-123
		OXIDE C	A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-C-A A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-C-B		TP301/DM-123
		OXIDE Y	A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-Y-A A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-Y-B		TP101/DM-123
		Data saving	A3F : NV-RAM CONTROL		

(Continued)

No.	Item		Adjustment point	Remarks
7-2-10	DM RF output level adjustment (Analog Betacam)	OXIDE Y	⊘RV112/DM-123	TP107/DM-123
		OXIDE C	⊘RV312/DM-123	TP307/DM-123
		METAL C	⊘RV311/DM-123	TP307/DM-123
		METAL Y	⊘RV111/DM-123	TP107/DM-123
7-2-11	OMC carrier balance adjustment (Analog Betacam)	METAL Y	A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-B	TP109/DM-123
		METAL C	A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-B	TP309/DM-123
		OXIDE C	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-B	TP309/DM-123
		OXIDE Y	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-B	TP109/DM-123
		Data saving	A3F : NV-RAM CONTROL	
7-2-12	OMC carrier balance provisional adjustment (Analog Betacam)	**Note** This provisional adjustment explains how to adjust without using the spectrum analyzer as opposed to adjustment (Section 7-2-11) using the spectrum analyzer. Perform this provisional adjustment only when the spectrum analyzer is not available for an urgent maintenance. Be sure to perform the adjustment (Section 7-2-11) using the spectrum analyzer at a later date.		
7-2-13	Demodulator limiter balance adjustment (Analog Betacam)	OXIDE-Y	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y	TP502/DM-123
		METAL-Y	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y	TP502/DM-123
		METAL-C	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C	TP706/DM-123
		OXIDE-C	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C	TP706/DM-123
		Data saving	A3F : NV-RAM CONTROL	
7-2-14	PB frequency response adjustment (Analog Betacam)	METAL Y	A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B	VIDEO OUTPUT COMPONENT Y VIDEO OUTPUT COMPONENT Y
		METAL C	A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B	VIDEO OUTPUT COMPONENT R-Y/B-Y VIDEO OUTPUT COMPONENT R-Y/B-Y
		OXIDE Y	A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B	VIDEO OUTPUT COMPONENT Y VIDEO OUTPUT COMPONENT Y
		OXIDE C	A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B	VIDEO OUTPUT COMPONENT R-Y/B-Y VIDEO OUTPUT COMPONENT R-Y/B-Y
		Data saving	A3F : NV-RAM CONTROL	
7-2-15	DM RF output level readjustment (Analog Betacam) (Perform "7-2-10. DM RF output level adjustment" again.)	OXIDE Y	⊘RV112/DM-123	TP107/DM-123
		OXIDE C	⊘RV111/DM-123	TP307/DM-123
		METAL C	⊘RV312/DM-123	TP307/DM-123
		METAL Y	⊘RV311/DM-123	TP107/DM-123
7-2-16	RF envelope adjustment (Analog Betacam)	Y	⊘RV113/DM-123	TP112/DM-123
		C	⊘RV313/DM-123	TP312/DM-123
7-2-17	Impact error offset adjustment (Analog Betacam)	Y	A41 : LVL/IMP/PHASE VR : IMP OFFSET-Y	Video monitor
		C	A41 : LVL/IMP/PHASE VR : IMP OFFSET-C	Video monitor
		Data saving	A4F : NV-RAM CONTROL	

(Continued)

No.	Item		Adjustment point	Remarks
7-2-18	TBC Y/C delay adjustment (Analog Betacam)	METAL	**NTSC model**	
			A42 : YC DL VR : Y/C DELAY M-A	VIDEO OUTPUT COMPONENT
			A42 : YC DL VR : Y/C DELAY M-B	VIDEO OUTPUT COMPONENT
			PAL model	
			A42 : YC DL/Y TR VR : Y/C DELAY M-A	VIDEO OUTPUT COMPONENT
			A42 : YC DL/Y TR VR : Y/C DELAY M-B	VIDEO OUTPUT COMPONENT
		OXIDE	**NTSC model**	
			A42 : YC DL VR : Y/C DELAY O-A	VIDEO OUTPUT COMPONENT
			A42 : YC DL VR : Y/C DELAY O-B	VIDEO OUTPUT COMPONENT
			PAL model	
			A42 : YC DL/Y TR VR : Y/C DELAY O-A	VIDEO OUTPUT COMPONENT
			A42 : YC DL/Y TR VR : Y/C DELAY O-B	VIDEO OUTPUT COMPONENT
		Data saving	A4F : NV-RAM CONTROL	
7-2-19	AFM RF level adjustment (Betacam SP)		⊘RV500/AU-272	TP503/AU-272 TP504/AU-272

7-2-2. Common Preparation

Set switches, function menu, setup extend menu, and others specified before starting the adjustments. After completing all the adjustments, be sure to reset them to the customer settings.

1. Reset all the switches on the DM-123 board to the factory settings.

   Notes

   - For HDW-2000/D2000, DVW-2000/P and MSW-2000, this resetting is not required.
   - Before removing the board, turn off the power.

Board	Ref. No.	Factory setting
DM-123	S1701, S1801	all OFF (lower side)

2. **For DVW and MSW series**

   Set the Bit-1 of the DIP switch S1502 (B-1) on the SS-89 board to ON (upper) to enable the operation of the setup extended menu. (S1502-1 customer setting : ☐ ON ☐ OFF)

   Note

   This switch is set to ON at the factory shipping for HDW series.

3. Turn on the power.
4. **For HDW and MSW series**

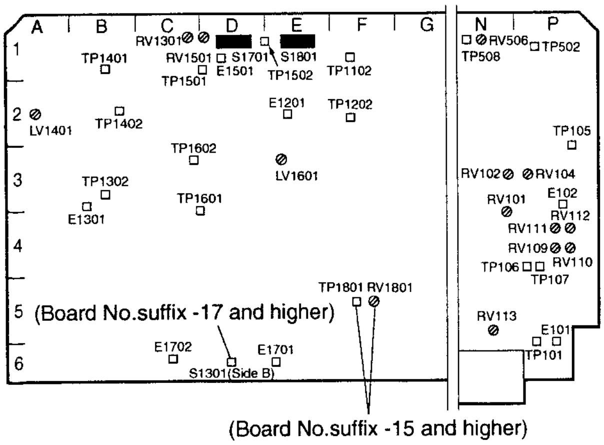
   Check that this unit sets into the standard mode.

   If it does not, change the setting of the setup menu ITEM-013. (Refer to the operation manual.)

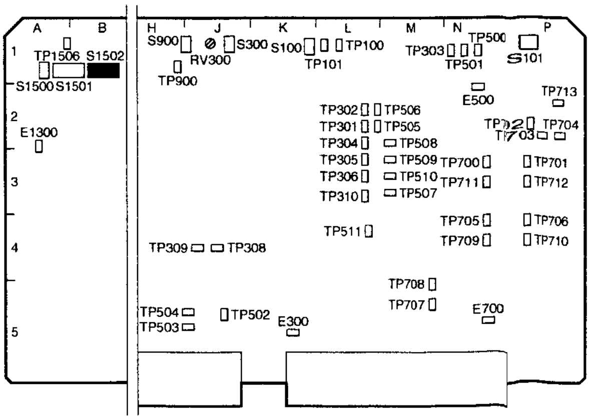
   NTSC model: Standard mode: 59.94 Hz or 525
   Alternative mode: 50 Hz or 625
   PAL model: Standard mode: 50 Hz or 625
   Alternative mode: 59.94 Hz or 525

   Note

   Menu ITEM-013 does not exist in DVW series.


A B C D E F G N P
1 2 3 4 5 6
RV1301
TP1401
RV1501
S1701
S1801
TP1501
E1501
TP1502
TP1102
RV506
TP502
TP508
E1201
TP1202
LV1401
TP1402
TP105
TP1602
LV1601
TP1302
RV102
RV104
TP1601
RV101
E102
E1301
RV112
RV111
RV109
RV110
TP106
TP107
TP1801
RV1801
(Board No.suffix -17 and higher)
RV113
E101
E1702
E1701
TP101
S1301(Side B)
(Board No.suffix -15 and higher)

DM-123 Board (Side A)


A B H J K L M N P
1 2 3 4 5
TP1506
S1502
S1500
S1501
E1300
S900
S300
S100
TP100
TP303
TP500
S101
RV300
TP101
TP501
TP900
E500
TP713
TP302
TP506
TP301
TP505
TP702
TP704
TP304
TP508
TP703
TP305
TP509
TP700
TP701
TP306
TP510
TP711
TP712
TP310
TP507
TP705
TP706
TP511
TP709
TP710
TP309
TP308
TP708
TP707
TP504
TP502
E300
E700
TP503

SS-89 Board (Side A)

5. Set the VTR's switches and function menu as follows:

Note

[R]: For recorder only

Location	Item			Customer setting		Setting at adjustment	Remarks
Switch panel	KEY INHIBIT switch				⇨	OFF	
Upper control panel	REMOTE:		1 (9P)		⇨	OFF (Light off)	
			2 (50P)		⇨	OFF (Light off)	
Function menu	Page1	[R]	F1 (TCG)		⇨	INT	
		[R]	F2 (TCG)		⇨	REGEN	
		[R]	F3 (RUN)		⇨	REC RUN	
			F6 (TCR)		⇨	LTC	
	Page2		F1 (V. PROC)		⇨	LOCAL	
			F2 (VIDEO)		⇨	PRESET	
			F3 (CHROMA)		⇨	PRESET	
			F4 (HUE/C PHAS)		⇨	PRESET	
			F5 (SETUP/BLACK)		⇨	PRESET	
			F6 (YC DLY)		⇨	PRESET	
	Page4		F1 (CAPSTN)		⇨	2FD	
		[R]	F2 (OUT REF)		⇨	REF	
			F4 (CHARA)		⇨	ON	
			F5 (REC INH)		⇨	OFF	

6. Set the ITEM-709 and -713 in the setup extended menu as follows:

Note

This settings are not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

ITEM No.		SUB-ITEM	Customer setting		Setting at adjustment
709 :	CAV LEVEL FORMAT	1. OUTPUT CAV LEVEL		⇨	B-CAM
713 :	VIDEO SETUP REFERENCE LEVEL	0. MASTER LEVEL		⇨	0.0%
		3. BETACAM PB LEVEL		⇨	MSTER
		4. OUTPUT LEVEL		⇨	MSTER

7-2-3. Drum Phase Adjustment

Note

The recorder executes the SAT ENV GAIN adjustment at the same time.

Alignment tape:

For HDW Recorder:	HR2-1A
For HDW Player:	HR5-1A
For DVW-2000/M2000:	ZR2-1
For DVW-2000P/M2000P:	ZR2-1P
For MSW Recorder:	MR2-1P
For MSW-M2100/M2100E:	MR5-1
For MSW-M2100P/M2100EP:	MR5-1P

1. Insert the alignment tape, then rewind it to the tape biginning.
2. Enter the maintenance mode.
3. Enter A00 : SERVO ADJUST.
   MAINTENANCE MODE → M1 : ADJUST → A0 : SERVO/DT → A00 : SERVO ADJUST
   - The alignment tape is ejected.
4. Enter A00B : RF SWITCHING POS.
5. Select "AUTO".
6. Insert the alignment tape again, then the adjustment is executed automatically.
   - Message "AUTO ADJUST COMPLETE" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A00B : RF SWITCHING POS, press the F6 (EXIT) button once.

Saving the Data

8. Enter A00F : NV-RAM CONTROL, then execute "SAVE SERVO ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.
10. Eject the alignment tape.

When 24Psf recording is available in the HDW series

11. Switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and repeat steps 1 to 10.

7-2-4. SAT Signal Level Check (for Recorder Only)

Notes

- **For HDW and MSW series:**
  This check is required in both the standard mode and the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 625
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

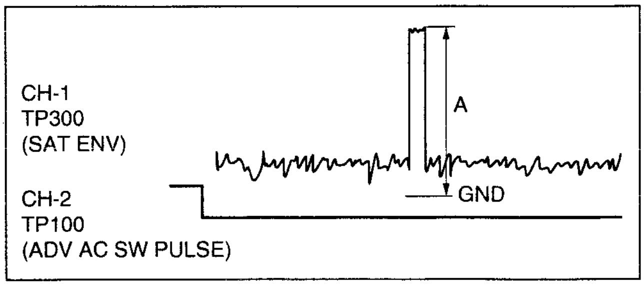
- When 24Psf recording is available in the HDW series, this check is required separately in the 24 Hz mode.

Models to be checked: HDW recorder , DVW recorder and MSW recorder

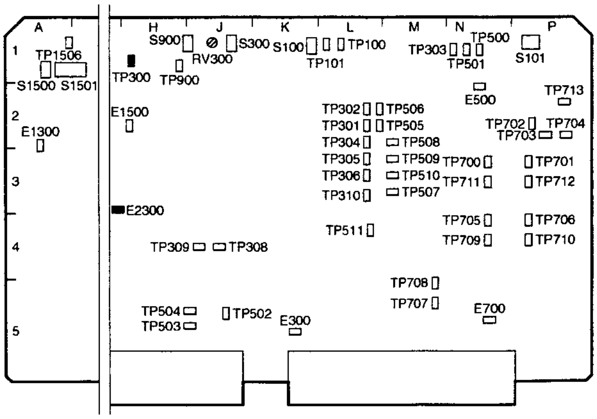
Tools

- Oscilloscope
- Extension board EX-739
- Recording tape: for HDW series: BCT-HD
  for DVW series: BCT-D
  for MSW series: BCT-MX

1. Turn the power off.
2. Extend the SS-89 board with an extension board EX-739.
3. Turn the power on.
4. Connect and set the oscilloscope as follows:
   CH-1: TP300/SS-89(H-1), DC 500 mV/DIV
   GND: E2300/SS-89(H-4)
   CH-2: TP100/EQ-84(D-1 or E-1), DC 2 V/DIV
   GND: E100/EQ-84(E-1)
   TIME: 500 μs/DIV
   TRIG: CH-2, − slope
5. Insert a recording tape, and then carry out recording for about 30 seconds.
6. Play back the recorded portion. After the servo locks in, check the waveform of CH-1 in the low level period of CH-2.
   Specification: $1.0 \leqq A \leqq 2.5$ V
   When the specification is not satisfied, carry out "7-2-3. Drum Phase Adjustment", and then perform this check again.

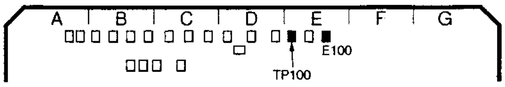


7. **For HDW and MSW series**
   Switch the operation mode to the alternative mode with the setup menu ITEM-013, and then perform steps 5 and 6 again.
8. When 24Psf recording is available in the HDW series, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and repeat steps 5 and 6.
9. **For HDW and MSW series**
   Reset the operation mode to the standard mode with the setup menu ITEM-013.

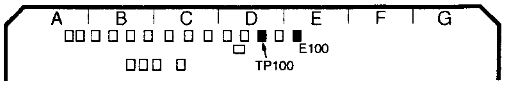

A
H
J
K
L
M
N
P
1
2
3
4
5
TP1506
S1500 S1501
E1300
S900
S300
S100
TP100
RV300
TP101
TP303
TP500
TP501
S101
TP300 TP900
E1500
E500
TP713
TP302
TP506
TP301
TP505
TP702
TP704
TP703
TP304
TP508
TP305
TP509
TP700
TP701
TP306
TP510
TP711
TP712
TP310
TP507
E2300
TP705
TP706
TP511
TP709
TP710
TP309
TP308
TP708
TP707
TP504
TP502
E300
E700
TP503

SS-89 Board (Side A)

Board No.suffix -12


A
B
C
D
E
F
G
E100
TP100

Board No.suffix -13 and higher


A
B
C
D
E
F
G
E100
TP100

EQ-84 Board (Side A)

7-2-5. Digital DT System Adjustment

Note

Perform this adjustment in the standard mode.

Alignment tape:

For HDW series:	HR5-1A
For DVW series (NTSC model):	ZR5-1
For DVW series (PAL model):	ZR5-1P
For MSW series (NTSC model):	MR5-1
For MSW series (PAL model):	MR5-1P

1. Insert the alignment tape, then cue up it to the time code 00:10:00:00.
2. Enter the maintenance mode.
3. Enter A01 : DT ADJUST.
   MAINTENANCE MODE → M1 : ADJUST → A0 : SERVO/DT → A01 : DT ADJUST
4. Enter A010 : DIGITAL DT ADJUST.
5. Message "Auto Adjust (Push SET)" is displayed on the video monitor, then press F5 (SET) button.
   - The alignment tape is ejected.
6. Message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape again.
   - Adjustment is executed automatically when the alignment tape is inserted.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A010 : DIGITAL DT ADJUST, press the F6 (EXIT) button once.

   Note

   When the automatic adjustment is completed normally, the alignment tape is ejected automatically.

Saving the Data

8. Enter A01F : NV-RAM CONTROL, then execute "SAVE DT DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.

7-2-6. PB Equalizer Automatic Adjustment

For Section 7-2-6 and 7-2-7, perform the automatic adjustments in the maintenance mode for all the digital formats that can record or play back.

Adjustment format	HDW-					DVW-		MSW-			
	2000	D2000	M2000/P	S2000/P	M2100/P	2000	M2000/P	2000	A2000/P	M2000/P M2000E/P	M2100/P M2100E/P
Section 7-2-6 1. HDCAM	○[*1]	○[*1]	○[*1]	○[*1]	○[*1]	—	—	—	—	—	—
2. Digital Betacam	—	○	○	—	○	○	○	—	—	○	—
3. MPEG IMX	—	○	○	—	○	—	○	○	○	○	○
4. Betacam SX	—	—	○	○	○	—	○	○	○	○	○
Section 7-2-7											
1. HDCAM	○[*1]	○[*1]	○[*1]	○[*1]	—	—	—	—	—	—	—
2. Digital Betacam	—	—	—	—	—	○	○	—	—	—	—
3. MPEG IMX	—	—	—	—	—	—	—	○	○	○	—

*1 : When 24Psf recording is available, this adjustment is required in the 24 Hz mode.

Notes

- **For HDW series and MSW series:**
  This section needs both adjustments in the standard mode and the alternative mode.
  First, adjust in the standard mode, and then in the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 625
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

- When this adjustment is not finished normally, perform "6-7. PB Head Head-to-tape Contact Check".

1. PB Equalizer Adjustment for HDCAM

Applicable models: HDW series

Alignment tape: HR5-1A

1. Insert the alignment tape, then cue up it in time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A131 : EQUALIZER.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A13 : HD RF ADJUST
   →
   A131 : EQUALIZER
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (∗) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment, press the F5 (SET) button once.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A131 : EQUALIZER, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the alignment tape.

Note

- HDW-2000 ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- HDW-D/M series ⇨ Go to "2. PB Equalizer Adjustment for Digital Betacam".
- HDW-S2000/P ⇨ Go to "4. PB Equalizer Adjustment for Betacam SX".

2. PB Equalizer Adjustment for Digital Betacam

Applicable models: HDW-D/M series, DVW series and MSW-M series

Alignment tape:	for 59.94 Hz or 525 mode:	ZR5-1
	for 50 Hz or 625 mode:	ZR5-1P

1. Insert the alignment tape, then cue up it in time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A121 : EQUALIZER.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A12 : DB RF ADJUST → A121 : EQUALIZER
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment, press the F5 (SET) button once.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A121 : EQUALIZER, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the alignment tape.

Note

- HDW-D/M series ⇨ Go to "3. PB Equalizer Adjustment for MPEG IMX".
- DVW-2000/P ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- DVW-M2000/P ⇨ Go to "3. PB Equalizer Adjustment for MPEG IMX".
- MSW-M series ⇨ Go to "3. PB Equalizer Adjustment for MPEG IMX".

3. PB Equalizer Adjustment for MPEG IMX

Applicable models: HDW-D/M series, DVW-M series and MSW-M series

Alignment tape: for 59.94 Hz or 525 mode: MR5-1
for 50 Hz or 625 mode: MR5-1P

1. Insert the alignment tape, then cue up it in time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A111 : EQUALIZER.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A11 : IMX RF ADJUST →
   A111 : EQUALIZER
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment, press the F5 (SET) button once.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A111 : EQUALIZER, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the alignment tape.

Note

- HDW-D2000 ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- HDW-M series ⇨ Go to "4. PB Equalizer Adjustment for Betacam SX".
- DVW-M series ⇨ Go to "4. PB Equalizer Adjustment for Betacam SX".
- MSW-M series ⇨ Go to "4. PB Equalizer Adjustment for Betacam SX".

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4. PB Equalizer Adjustment for Betacam SX

Applicable models: HDW-M/S series, DVW-M series and MSW series

Alignment tape:	for 59.94 Hz or 525 mode:	SR5-1
	for 50 Hz or 625 mode:	SR5-1P

1. Insert the alignment tape, then cue up it in time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A101 : EQUALIZER.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A10 : SX RF ADJUST → A101 : EQUALIZER
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment, press the F5 (SET) button once.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A101 : EQUALIZER, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the alignment tape.

Note

- HDW-M2000/P, S2000/P ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- HDW-M2100/P ⇨ Switch the operation mode to the alternative mode (50 Hz for NTSC model, 59.94 Hz for PAL model) with the setup menu ITEM-013, and then perform required adjustments from step 1 of Section 7-2-6 again.
- DVW-M2000/P ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- MSW-2000, A2000/P, M2000/P, M2000E/P
  ⇨ Go to "7-2-7. Recording Current Automatic Adjustment".
- MSW-M2100/P, M2100E/P ⇨ Switch the operation mode to the alternative mode (625 for NTSC model, 525 for PAL model) with the setup menu ITEM-013, and then perform required adjustments from step 2 of Section 7-2-6 again.

7-2-7. Recording Current Automatic Adjustment (for Recorder Only)

- The recording current adjustment is not required for the player.
- Perform the required adjustment according to recordable format in the unit.

Note

For HDW series and MSW series:

Adjustments in Sections 7-2-6 and 7-2-7 are required in the standard mode, alternative mode, and the 24 Hz mode.

First, adjust in the standard mode, and then in the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 625
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

---

1. Recording Current Adjustment for HDCAM

Applicable models: HDW-2000/D2000
HDW-M2000/M2000P
HDW-S2000/S2000P

1. Insert a recording tape for HDCAM.
2. Enter the maintenance mode.
3. Enter A132 : REC CURRENT.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A13 : HD RF ADJUST → A132 : REC CURRENT
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is positioned at "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to position it at "ALL" .
5. To execute the automatic adjustment for the recording current, press the F5 (SET) button on the lower control panel.
   - Message "Auto Adjust Complete" is displayed on the video monitor when this adjustment is completed normally.
6. To exit A132 : REC CURRENT, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the recording tape.

Notes

- Switch the operation mode to the alternative mode (50 Hz for NTSC model, 59.94 Hz for PAL model) with the setup menu ITEM-013, and then perform required adjustments of Sections 7-2-6 and 7-2-7 again.
- When 24Psf recording is available, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and perform adjustments of Section 7-2-6 "1. PB Equalizer Adjustment for HDCAM" and of this section.

2. Recording Current Adjustment for Digital Betacam

Applicable models: DVW-2000/2000P
DVW-M2000/M2000P

1. Insert a recording tape for Digiral Betacam.
2. Enter the maintenance mode.
3. Enter A122 : REC CURRENT.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A12 : DB RF ADJUST → A122 : REC CURRENT
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment for the recording current, press the F5 (SET) button once on the lower control panel.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A122 : REC CURRENT, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the recording tape.

3. Recording Current Adjustment for MPEG IMX

Applicable models: MSW-2000
MSW-A2000/A2000P
MSW-M2000/M2000P/M2000E/M2000EP

1. Insert a recording tape for MPEG IMX.
2. Enter the maintenance mode.
3. Enter A112 : REC CURRENT.
   MAINTENANCE MODE → M1 : ADJUST → A1 : RF → A11 : IMX RF ADJUST → A112 : REC CURRENT
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Ensure that asterisk cursor (*) is aligned with "ALL" on the video monitor.
   If not, turn the MULTI CONTROL knob to align it.
5. To execute the automatic adjustment for the recording current, press the F5 (SET) button once on the lower control panel.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A112 : REC CURRENT, press the F6 (EXIT) button once.

Saving the Data

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

8. Exit the maintenance mode.
9. Eject the recording tape.

Note

Switch the operation mode to the alternative mode (625 for NTSC model, 525 for PAL model) with the setup menu ITEM-013, and then perform required adjustments of Sections 7-2-6 and 7-2-7 again.

7-2-8. Analog DT System Automatic Adjustment (Analog Betacam)

Notes

- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- Perform this adjustment in the standard mode.

Alignment tape:	
for NTSC model:	CR5-1B
for PAL model:	CR5-1B PS

1. Insert the alignment tape, then cue up it to the time code 00:14:00:00.
2. Enter the maintenance mode.
3. Enter A01 : DT ADJUST.
   MAINTENANCE MODE → M1 : ADJUST → A0 : SERVO/DT → A01 : DT ADJUST
4. Enter A010 : ANALOG DT ADJUST.
5. Message "Auto Adjust (Push SET)" is displayed on the video monitor, then press F5 (SET) button.
   - The alignment tape is ejected.
6. Message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape again.
   - Adjustment is executed automatically after the alignment tape is inserted.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A010 : ANALOG DT ADJUST, press the F6 (EXIT) button once.

   Note

   When the automatic adjustment is completed normally, the alignment tape is ejected automatically.

Saving the Data

8. Enter A01F : NV-RAM CONTROL, then execute "SAVE DT DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.

7-2-9. EQ RF Output Level Adjustment (Analog Betacam)

Notes

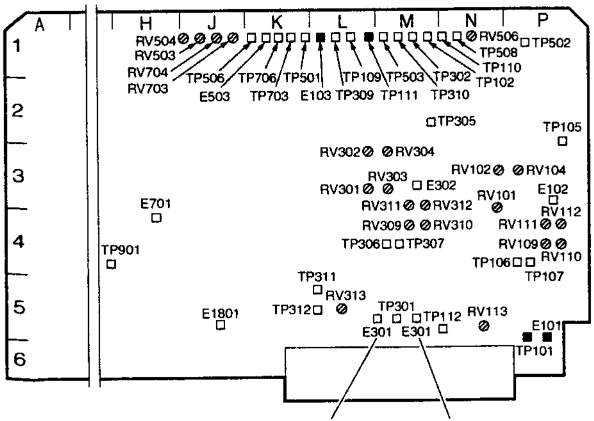
- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- **For HDW series and MSW series:**
  This adjustment is required in both the standard mode and the alternative mode.
  First, adjust in the standard mode, and then in the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 652
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

Alignment tapes:
for 59.94 Hz or 525 mode: CR5-1B and CR5-2A
for 50 Hz or 625 mode: CR5-1B PS and CR5-2A PS

Measuring equipment: Oscilloscope

1. Turn off the power.
2. Extend the DM-123 board with an extension board EX-739.
3. Turn on the power.
4. Enter the maintenance mode.
5. Enter A30 : RF GAIN VR (EQ VR)
   MAINTENANCE MODE → M1 : ADJUST → A3 : BETACAM PB (DM) → A30 : RF GAIN VR (EQ VR)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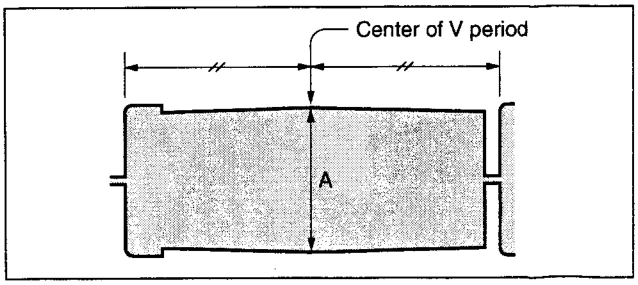
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

METAL Y adjustment

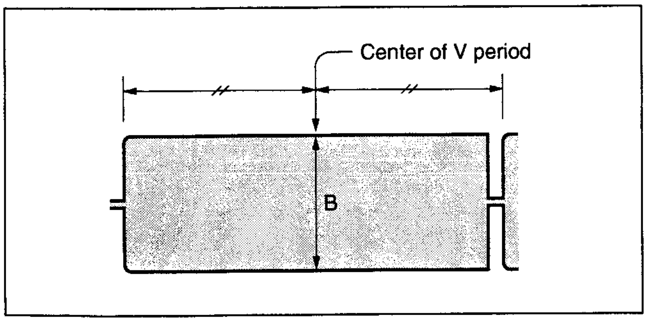
6. Connect and set the oscilloscope as follows:
   Band width limit: ON (20 MHz)
   CH-1: TP101/DM-123(P-6), AC 100 mV/DIV
   GND: E101/DM-123(P-6)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 2 ms/DIV
   TRIG: CH-2
7. Play back the flat field signal portion (24:00 to 26:00) of the alignment tape listed below.
   for 59.94 Hz or 525 mode: CR5-1B
   for 50 Hz or 625 mode: CR5-1B PS
8. Set the oscilloscope's trigger to the − slope, then adjust the level of METAL Y-A (ch-A of METAL Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-A
   Specification: A = 500 ±20 mV p-p
9. Set the oscilloscope's trigger to the + slope, then adjust the level of METAL Y-B (ch-B of METAL Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-B
   Specification: A = 500 ±20 mV p-p
10. Switch the polarity (−/+) of the oscilloscope's trigger slope to check the level difference between the METAL Y-A and METAL Y-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
A

11. Stop the playback of the alignment tape.

METAL C adjustment

12. Change the connection of the oscilloscope CH-1 as follows: (Keep the setting of the oscilloscope and CH-2 connection.)
    CH-1: TP301/DM-123(M-5)
    GND: E301/DM-123(L-5)
13. Play back the flat field signal portion (24:00 to 26:00) of the alignment tape listed below.
    for 59.94 Hz or 525 mode: CR5-1B
    for 50 Hz or 625 mode: CR5-1B PS
14. Set the oscilloscope's trigger to the – slope, then adjust the level of METAL C-A (ch-A of METAL C).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-A
    Specification: B = 500 ±20 mV p-p
15. Set the oscilloscope's trigger to the + slope, then adjust the level of METAL C-B (ch-B of METAL C).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-B
    Specification: B = 500 ±20 mV p-p
16. Switch the polarity (–/+) of the oscilloscope's trigger slope to check the level difference between the METAL C-A and METAL C-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
B

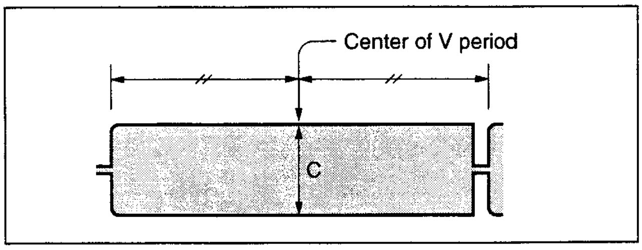
17. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

OXIDE C adjustment

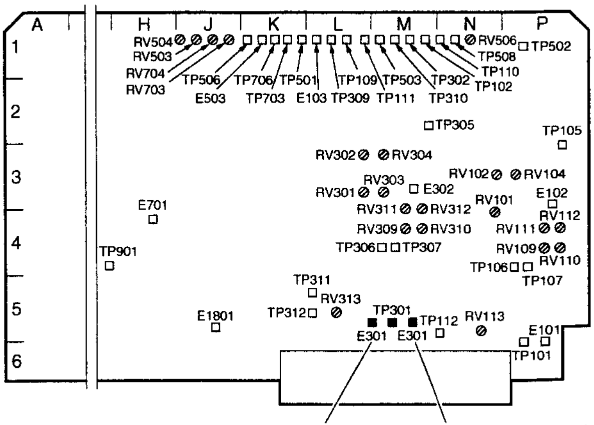
Note

The connections and settings of the oscilloscope are the same as "METAL C adjustment".

18. Play back the 75% color-bar signal portion (0:00 to 3:00) of the alignment tape listed below.
    for 59.94 Hz or 525 mode: CR5-2A
    for 50 Hz or 625 mode: CR5-2A PS
19. Set the oscilloscope's trigger to the – slope, then adjust the level of OXIDE C-A (ch-A of OXIDE C).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE C-A
    Specification: C = 300 ±20 mV p-p
20. Set the oscilloscope's trigger to the + slope, then adjust the level of OXIDE C-B (ch-B of OXIDE C).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE C-B
    Specification: C = 300 ±20 mV p-p
21. Switch the polarity (–/+) of the oscilloscope's trigger slope to check the level difference between the OXIDE C-A and OXIDE C-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
C

22. Stop the playback of the alignment tape.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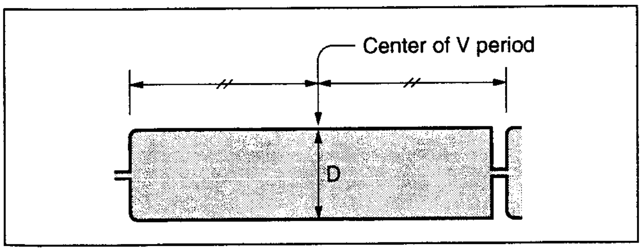
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

OXIDE Y adjustment

23. Change the connection of the oscilloscope CH-1 as follows: (Keep the setting of the oscilloscope and CH-2 connection.)
    CH-1: TP101/DM-123(P-6)
    GND: E101/DM-123(P-6)
24. Play back the 75% color-bar signal portion (0:00 to 3:00) of the alignment tape listed below.
    for 59.94 Hz or 525 mode: CR5-2A
    for 50 Hz or 625 mode: CR5-2A PS
25. Set the oscilloscope's trigger to the – slope, then adjust the level of OXIDE Y-A (ch-A of OXIDE Y).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE Y-A
    Specification: D = 300 ±20 mV p-p
26. Set the oscilloscope's trigger to the + slope, then adjust the level of OXIDE Y-B (ch-B of OXIDE Y).
    Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE Y-B
    Specification: D = 300 ±20 mV p-p
27. Switch the polarity (–/+) of the oscilloscope's trigger slope to check the level difference between the OXIDE Y-A and OXIDE Y-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
D

28. Stop the playback of the alignment tape.
29. To exit A30 : RF GAIN VR (EQ VR), press the F6 (EXIT) button once.

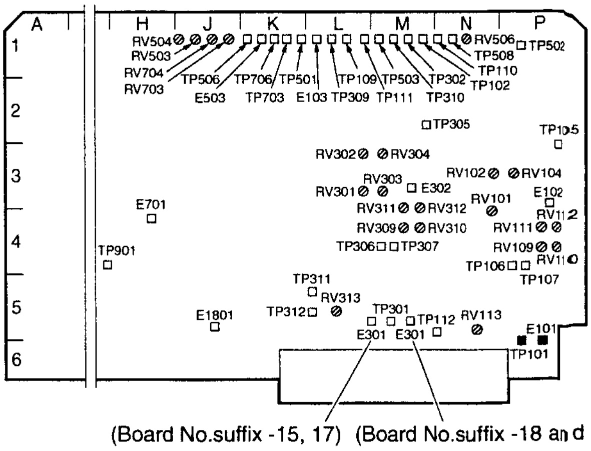
Saving the Data

30. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

31. Exit the maintenance mode.

Adjustment in the alternative mode

32. Switch operation mode to the alternative mode with the setup menu ITEM-013.
33. Perform all adjustments in this section to be within the specifications for the alternative mode, then save the data.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(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

7-2-10. DM RF Output Level Adjustment (Analog Betacam)

Notes

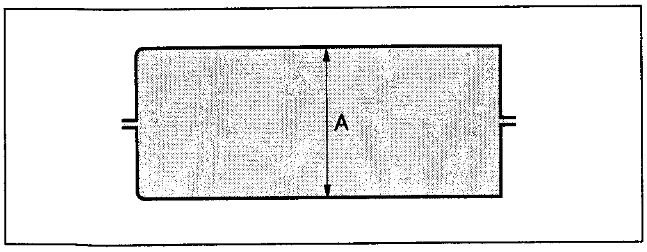
- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- Sections 7-2-10 through 7-2-19 do not need adjustment in the alternative mode.

Alignment tapes:
for NTSC model: CR5-1B and CR5-2A
for PAL model: CR5-1B PS and CR5-2A PS

Measuring equipment: Oscilloscope

OXIDE Y adjustment

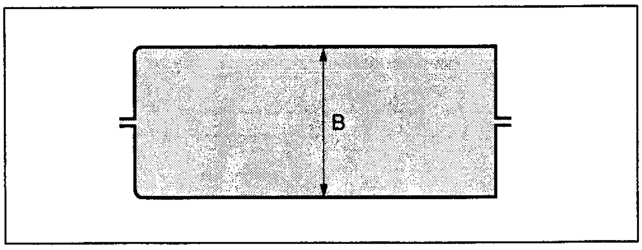
1. Connect and set the oscilloscope as follows:
   CH-1: TP107/DM-123(P-4), AC 100 mV/DIV
   GND: E102/DM-123(P-3)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 2 ms/DIV
   TRIG: CH-2, − slope
2. Adjust the level at the middle of V period while playing back the alignment tape in PLAY mode.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: ⊘RV112/DM-123(P-4)
   Specification: A = 400 ±40 mV p-p



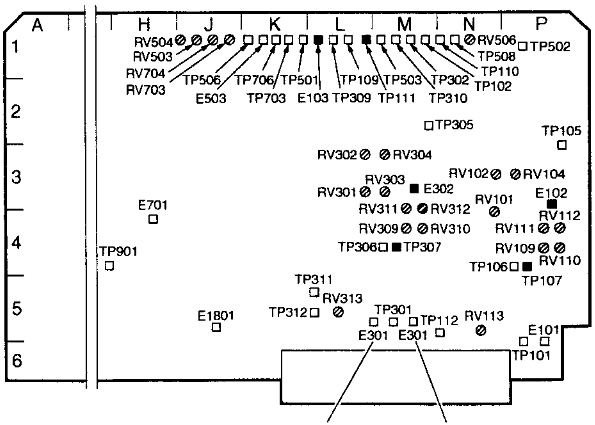
3. Stop the playback of the alignment tape.

OXIDE C adjustment

4. Change the connection of the oscilloscope CH-1 only as follows: (Keep the setting of the oscilloscope and CH-2 connection.)
   CH-1: TP307/DM-123(M-4)
   GND: E302/DM-123(M-3)
5. Adjust the level at the middle of V period while playing back the alignment tape in PLAY mode.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: ⊘RV312/DM-123(M-4)
   Specification: B = 400 ±40 mV p-p



6. Eject the alignment tape.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(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

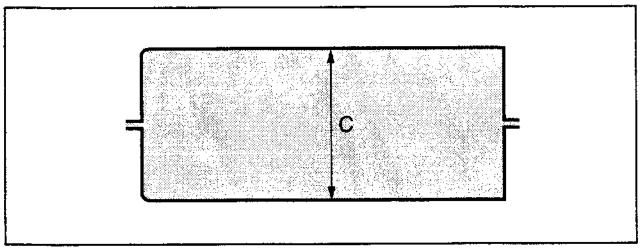
DM-123 Board (Side A)

METAL C adjustment

Note

Connection of the oscilloscope remains unchanged.

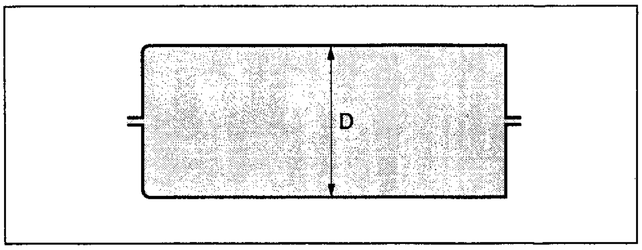
7. Adjust the level at the middle of V period while playing back the alignment tape in PLAY mode.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV311/DM-123(M-3)
   Specification: C = 400 ±40 mV p-p



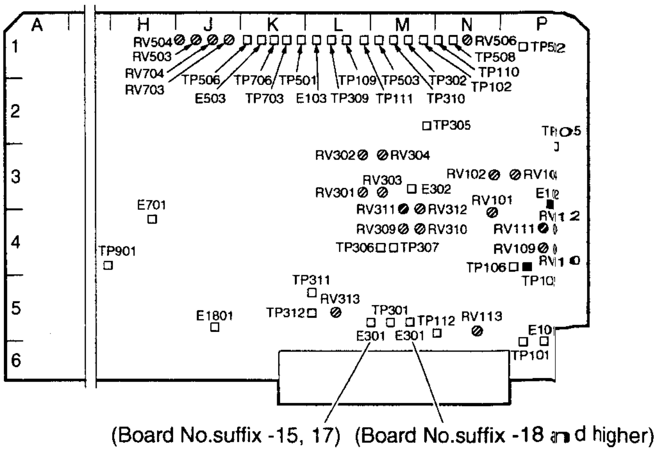
8. Stop the playback of the alignment tape.

METAL Y adjustment

9. Change the connection of the oscilloscope CH-1 only as follows: (Keep the setting of the oscilloscope and CH-2 connection.)
   CH-1: TP107/DM-123(P-4)
   GND: E102/DM-123(P-3)
10. Adjust the level at the middle of V period while playing back the alignment tape in PLAY mode.
    PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
    Adj. point: ⊘RV111/DM-123(P-4)
    Specification: D = 400 ±40 mV p-p



11. Stop the playback of the alignment tape.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(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

7-2-11. OMC Carrier Balance Adjustment (Analog Betacam)

Notes

- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- If the spectrum analyzer is not available, perform "7-2-12. OMC Carrier Balance Provisional Adjustment".

Alignment tapes:

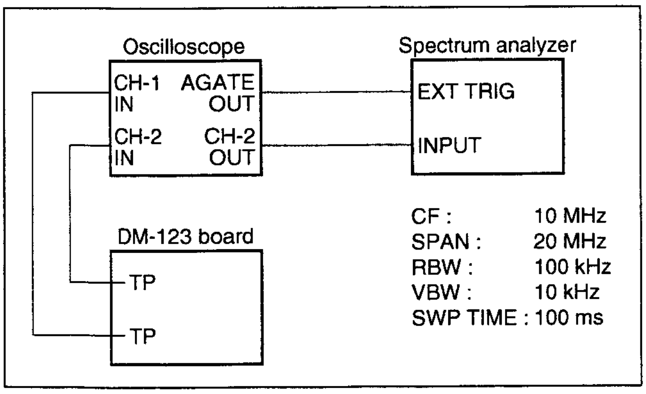
for NTSC model:	CR5-1B and CR5-2A
for PAL model:	CR5-1B PS and CR5-2A PS

Measuring equipment: Spectrum analyzer
Oscilloscope

Note

When the DM-123 board is extended, turn off the power of this unit and reattach the DM-123 board without using the extension board.

1. Connect and set the spectrum analyzer as follows:

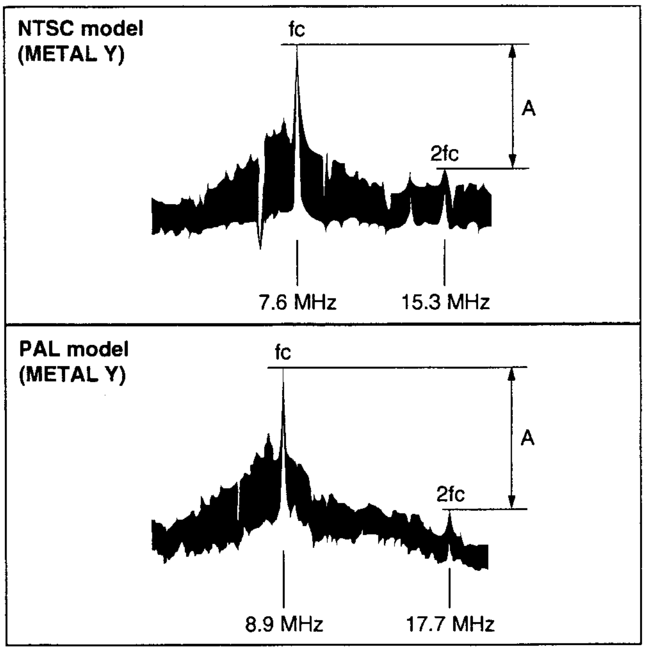

Oscilloscope
CH-1 IN
AGATE OUT
CH-2 IN
CH-2 OUT
Spectrum analyzer
EXT TRIG
INPUT
DM-123 board
TP
TP
CF : 10 MHz
SPAN : 20 MHz
RBW : 100 kHz
VBW : 10 kHz
SWP TIME : 100 ms

Connection and Setting of Spectrum Analyzer

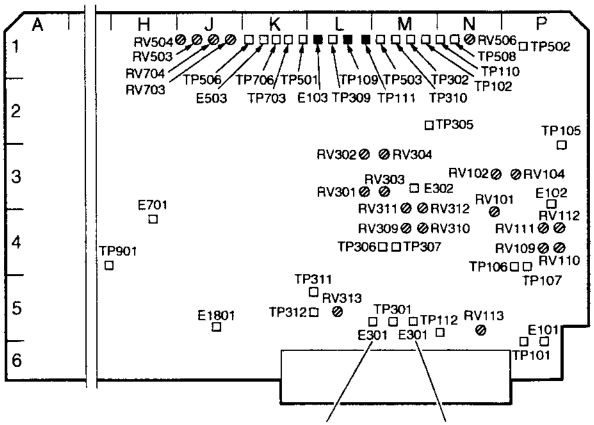
2. Enter the maintenance mode.
3. Enter A37 : OMC LIM BALANCE VR.
   MAINTENANCE MODE → M1 : ADJUST → A3 : BETACAM PB (DM) → A37 : OMC LIM BALANCE VR

METAL Y adjustment

4. Connect and set the oscilloscope as follows:
   CH-1: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   CH-2: TP109/DM-123(L-1), AC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 5 ms/DIV
   TRIG: CH-1, – slope
5. Adjust the level while playing back the alignment tape in PLAY mode.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A and OMC LIM METAL-Y-B
   Specification: A ≧ 40 dB



6. Stop the playback of the alignment tape.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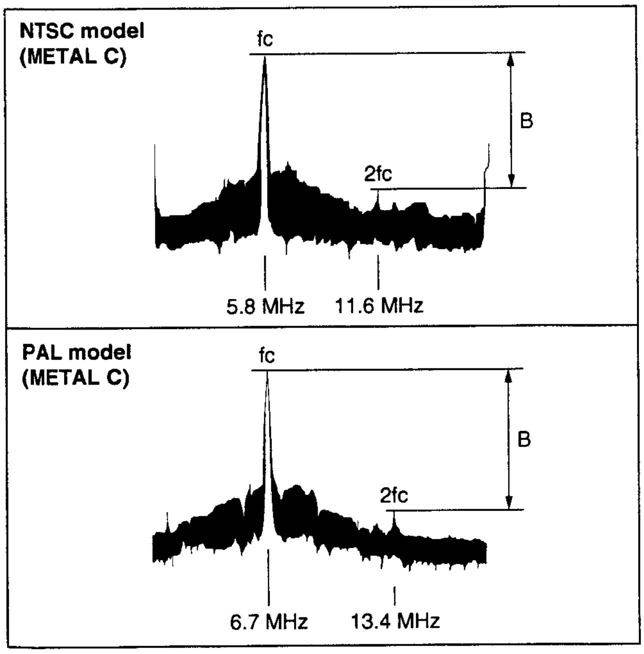
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

METAL C adjustment

7. Change the connection of the oscilloscope CH-2 only as follows: (Keep the setting of the oscilloscope and CH-1 connection.)
   CH-2: TP309/DM-123(L-1)
   GND: E103/DM-123(L-1)
8. Adjust the level while playing back the alignment tape in PLAY mode.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A and OMC LIM METAL-C-B
   Specification: B ≧ 40 dB



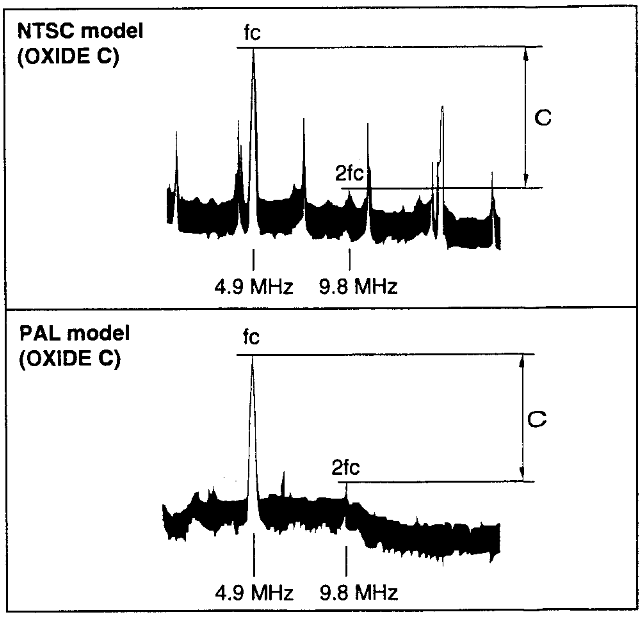
9. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

OXIDE C adjustment

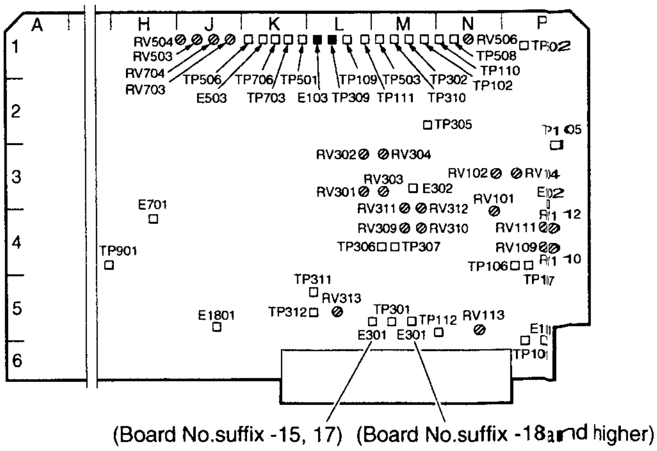
Note

Connection of the oscilloscope remains unchanged.

10. Adjust the level while playing back the alignment tape in PLAY mode.
    PB portion: Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS
    Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A and OMC LIM OXIDE-C-B
    Specification: C ≧ 35 dB



11. Stop the playback of the alignment tape.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RV301
E302
RV102
RV104
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
RV110
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

OXIDE Y adjustment

12. Change the connection of the oscilloscope CH-2 only as follows: (Keep the setting of the oscilloscope and CH-1 connection.)

    CH-2: TP109/DM-123(L-1)

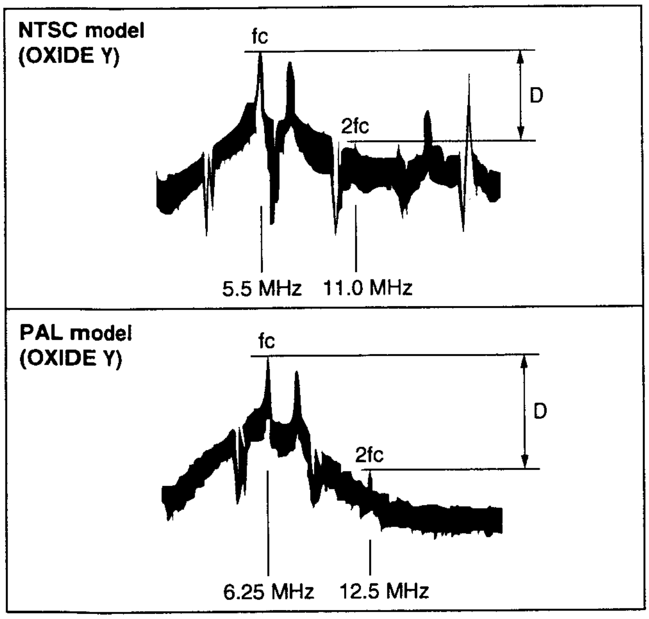
    GND: E103/DM-123(L-1)

13. Adjust the level while playing back the alignment tape in PLAY mode.

    PB portion: Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS

    Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A and OMC LIM OXIDE-Y-B

    Specification: D ≧ 35 dB

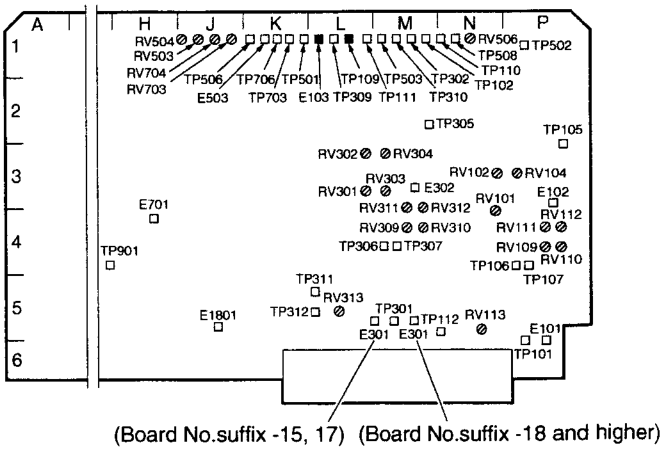


14. Stop the playback of the alignment tape.
15. To exit A37 : OMC LIM BALANCE VR, press the F6 (EXIT) button once.

Saving the Data

16. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

17. Exit the maintenance mode.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(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

7-2-12. OMC Carrier Balance Provisional Adjustment (Analog Betacam)

Notes

- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- This provisional adjustment explains how to adjust the OMC carrier balance without using the spectrum analyzer.
  If you have already performed "7-2-11. OMC Carrier Balance Adjustment" using the spectrum analyzer, this provisional adjustment is not required.
- Perform this provisional adjustment only when the spectrum analyzer is not available for an urgent maintenance. At a later date, be sure to perform "7-2-11. OMC Carrier Balance Adjustment" using the spectrum analyzer.

1. Enter the maintenance mode.
2. Enter A37 : OMC LIM BALANCE VR.
   MAINTENANCE MODE → M1 : ADJUST → A3 : BETACAM PB (DM) → A37 : OMC LIM BALANCE VR
3. Set each data of all the items of A37 : OMC LIM BALANCE VR to following initial data.

Item (A37 : OMC LIM BALANCE VR)	Initial data NTSC model	PAL model
OMC LIM METAL-Y-A	77	78
OMC LIM METAL-Y-B	77	78
OMC LIM METAL-C-A	54	51
OMC LIM METAL-C-B	54	51
OMC LIM OXIDE-Y-A	78	78
OMC LIM OXIDE-Y-B	78	78
OMC LIM OXIDE-C-A	55	55
OMC LIM OXIDE-C-B	55	55

4. To exit A37 : OMC LIM BALANCE VR, press the F6 (EXIT) button once.

Saving the Data

5. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

6. Exit the maintenance mode.

7-2-13. Demodulator Limiter Balance Adjustment (Analog Betacam)

Notes

- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- For the Y adjustment:
  When the spectrum analyzer is not available for an urgent maintenance, omit steps 4 through 9 in the Y adjustment.
  Be sure to perform the steps 4 through 9 in the Y adjustment at a later date.

Alignment tapes:
for NTSC model: CR5-1B and CR5-2A
for PAL model: CR5-1B PS and CR5-2A PS

Measuring equipment: Spectrum analyzer
Oscilloscope

Note

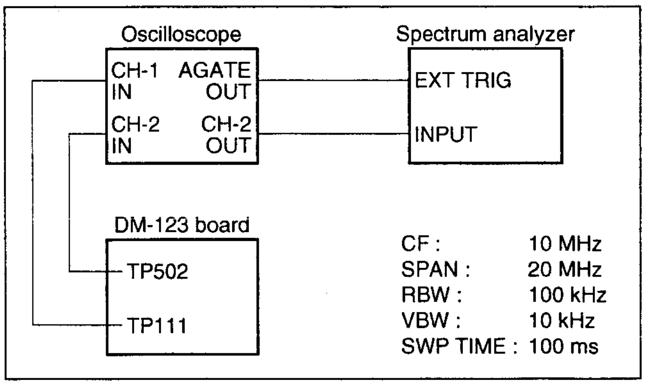
When the DM-123 board is extended, turn off the power of this unit and reattach the DM-123 board without using the extension board.

1. Enter the maintenance mode.
2. Enter A38 : DEMO BAL/ETC. VR.
   MAINTENANCE MODE → M1 : ADJUST → A3 : BETACAM PB (DM) → A38 : DEMO BAL/ETC. VR
3. Set each data of all the items of A38 : DEMO BAL/ETC. VR to the following initial data.

Item (A38 : DEMO BAL/ETC. VR)	Initial data NTSC model	 PAL model
DEMO BAL METAL-Y	83	80
DEMO BAL METAL-C	83	80
DEMO BAL OXIDE-Y	83	83
DEMO BAL OXIDE-C	83	83

Y adjustment

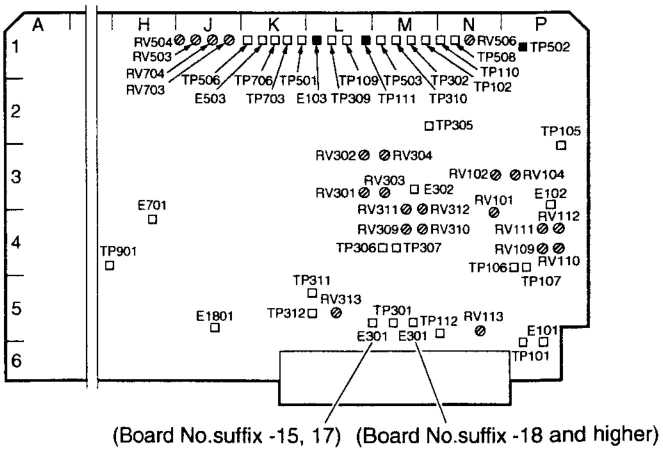
4. Connect and set the spectrum analyzer as follows:


Oscilloscope
CH-1 IN
AGATE OUT
CH-2 IN
CH-2 OUT
Spectrum analyzer
EXT TRIG
INPUT
DM-123 board
TP502
TP111

CF : 10 MHz
SPAN : 20 MHz
RBW : 100 kHz
VBW : 10 kHz
SWP TIME : 100 ms

Connection and Setting of the Spectrum Analyzer

5. Connect and set the oscilloscope as follows:
   CH-1: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   CH-2: TP502/DM-123(P-1), AC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 5 ms/DIV
   TRIG: CH-1, – slope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TP111
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TP302
TP102
TP110
TP508
RV506
TP502
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RV104
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E302
RV101
E102
E701
RV311
RV312
RV112
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RV113
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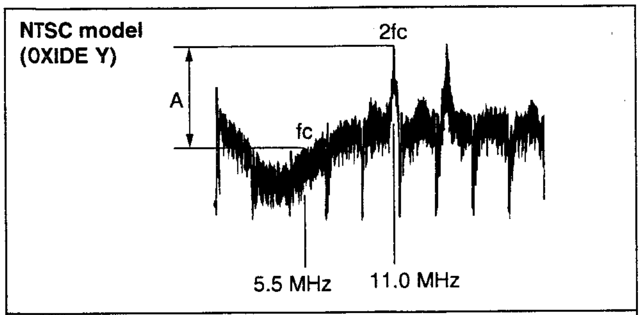
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

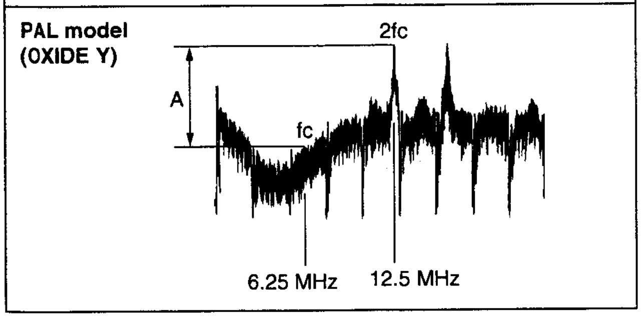
DM-123 Board (Side A)

(OXIDE Y)

6. Adjust the level while playing back the alignment tape in PLAY mode.

PB portion:	Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS
Adj. point:	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y
Specification:	Maximize the level difference A. (Minimize the fc.)



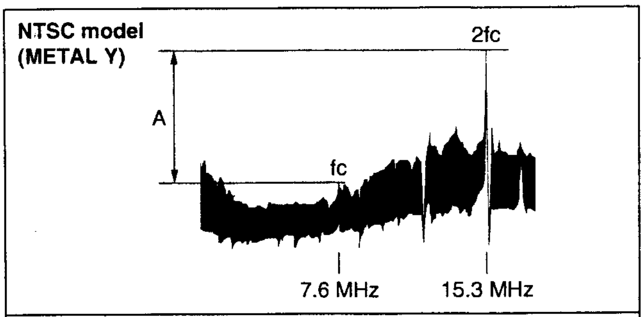


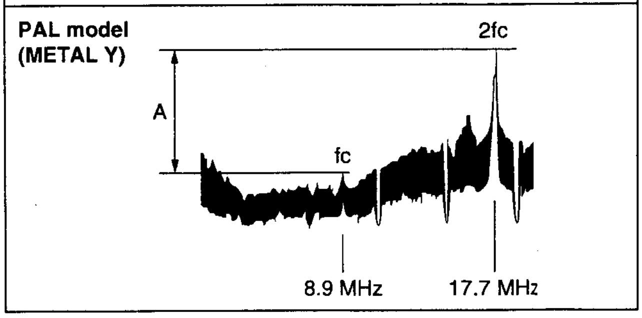
7. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

(METAL Y)

8. Adjust the level while playing back the alignment tape in PLAY mode.

PB portion:	Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
Adj. point:	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y
Specification:	Maximize the level difference A. (Minimize the fc.)





9. Stop the playback of the alignment tape.

C adjustment

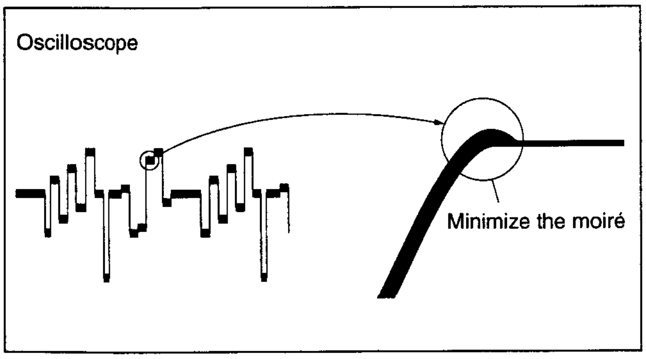
10. Change the connection of the oscilloscope for CH-2 only and settings as follows: (Keep the CH-1 connection)

    CH-2: TP706/DM-123(K-1), AC 200 mV/DIV
    GND: E503/DM-123(K-1)
    TIME: 10 μs/DIV

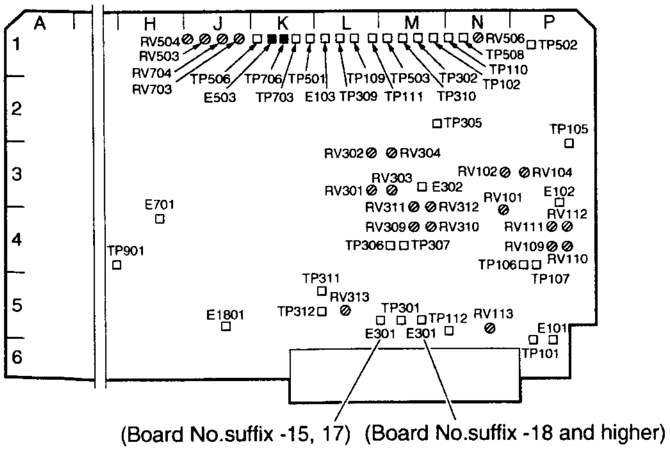
(METAL C)

11. Adjust the moiré of specified part on the oscilloscope while playing back the alignment tape in PLAY mode.

    PB portion: Flat filed signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
    Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C
    Specification: Minimize the moiré of specified part.


Oscilloscope
Minimize the moiré

12. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)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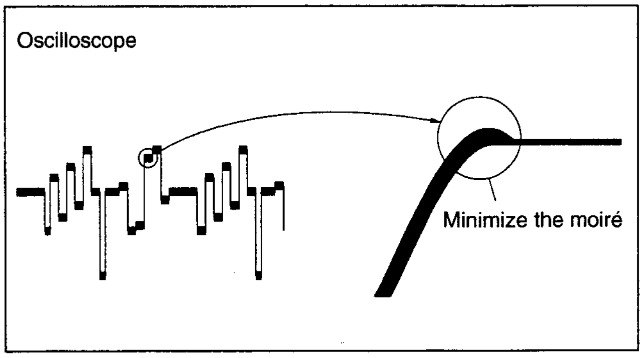
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
E301
E301
TP112
RV113
E101
TP101
E1801
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

(OXIDE C)

13. Adjust the moiré of specified part on the oscilloscope while playing back the alignment tape in PLAY mode.

    PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
    Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C
    Specification: Minimize the moiré of specified part.


Oscilloscope
Minimize the moiré

14. Stop the playback of the alignment tape.
15. To exit A38 : DEMO BAL/ETC. VR, press the F6 (EXIT) button once.

Saving the Data

16. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.
17. Exit the maintenance mode.
18. Eject the alignment tape.

7-2-14. PB Frequency Response Adjustment (Analog Betacam)

Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

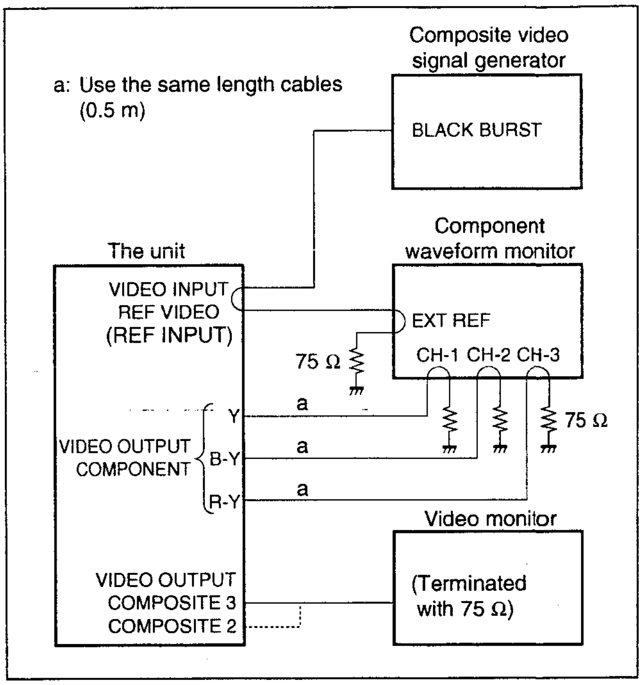
Alignment tapes:

for NTSC model:	CR5-1B and CR5-2A
for PAL model:	CR5-1B PS and CR5-2A PS

Measuring equipment:

Analog composite signal generator
Analog component waveform monitor
Video monitor

1. Connect the equipment as follows :


a: Use the same length cables (0.5 m)
Composite video signal generator
BLACK BURST
Component waveform monitor
EXT REF
CH-1 CH-2 CH-3
The unit
VIDEO INPUT
REF VIDEO
(REF INPUT)
75 Ω
Y
a
VIDEO OUTPUT COMPONENT
B-Y
a
R-Y
a
75 Ω
Video monitor
(Terminated with 75 Ω)
VIDEO OUTPUT
COMPOSITE 3
COMPOSITE 2

2. Enter the maintenance mode.

METAL Y adjustment

3. Enter A31 : COS EQ VR (METAL-Y).
   MAINTENANCE MODE → M1 : ADJUST → A3 : BETACAM PB (DM) → A31 : COS EQ VR (METAL-Y)
4. Watch the Y output signal on the analog component waveform monitor.

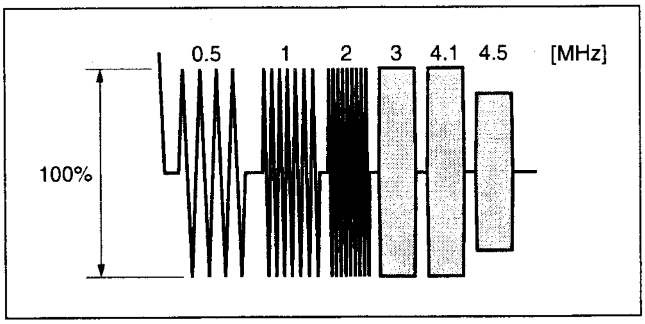
   Note

   As the Y output is overlapped the outputs of A channel and B channel on the analog component waveform monitor, adjust/check the level at each channel.

5. Measure the level at 0.5 MHz (NTSC model) / 2T BAR (PAL model) while playing back the alignment tape in PLAY mode.
   PB portion: Multi-burst signal (8:00 to 11:00) of CR5-1B / CR5-1B PS
   Use this measurement value as the reference level 100% (0 dB).
6. Adjust the level at 4.1 MHz (NTSC model) / 5 MHz (PAL model).
   PB portion: The same as step 5
   Adj. points:
   A channel: A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   B channel: A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B
   Specification (A and B channels):
   See the following table.
7. Play back the alignment tape in PLAY mode. Check to see that each level at the other frequency parts is within the specifications.
   PB portion: The same as step 5
   Specification (A and B channels):
   See the following table.
8. Connect the video monitor to VIDEO OUTPUT COMPOSITE 2 connector.
9. Play back the alignment tape in PLAY mode, check that the playback picture on the video monitor is clear with no flicker.
   PB portion: The same as step 5
   Specification: Clear picture with no flicker.
10. Reconnect the video monitor to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
11. To exit A31 : COS EQ VR (METAL-Y) , press the F6 (EXIT) button once.

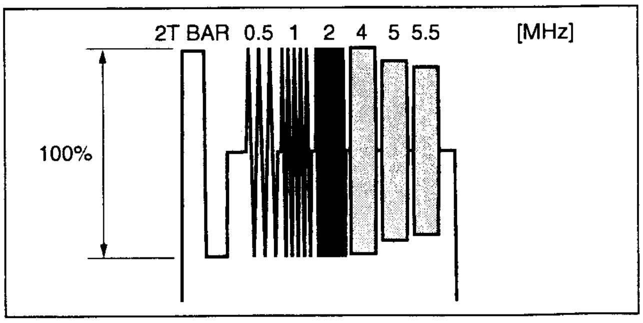
NTSC model Specifications (METAL Y)

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
4.1 MHz	Adjust: 94% (100 to 90%) {$-0.5\,^{+0.5}_{-0.4}$ dB}
1 MHz 2 MHz 3 MHz	Check: 100% (106 to 63%) {$0\,^{+0.5}_{-4.0}$ dB}
4.5 MHz	Check: 80% (106 to 63%) {$-2.0\,^{+2.5}_{-2.0}$ dB}



PAL model Specifications (METAL Y)

Frequency	Specification for PAL model (Level at 2T BAR is 100% {0 dB}.)
5 MHz	Adjust: 91% (96 to 87%) {−0.8 ±0.4 dB}
0.5 MHz 1 MHz 2 MHz 4 MHz	Check: 100% (106 to 63%) {$0\,^{+0.5}_{-4.0}$ dB}
5.5 MHz	Check: 84% (106 to 63%) {$-1.5\,^{+2.0}_{-2.5}$ dB}



METAL C adjustment

12. Enter A32 : COS EQ VR (METAL-C).
13. Watch the R-Y output signal on the analog component waveform monitor.

    Note

    As the R-Y(B-Y) output is overlapped the outputs of A channel and B channel on the analog component waveform monitor, adjust/check the level at each channel.

14. Measure the level at 7T BAR (NTSC model) / 8T BAR (PAL model) while playing back the alignment tape in PLAY mode.

    PB portion: Multi-burst signal (8:00 to 11:00) of CR5-1B / CR5-1B PS

    Use this measurement value as the reference level 100% (0 dB).
15. Adjust the level at 1 MHz (NTSC model) / 1.5 MHz (PAL model).

    PB portion: The same as step 14

    Adj. points:

    A channel: A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A

    B channel: A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B

    Specifications (A and B channels):
    See following the table.
16. Play back the alignment tape in PLAY mode. Check to see that each level at the other frequency parts is within the specifications.

    PB portion: The same as step 14

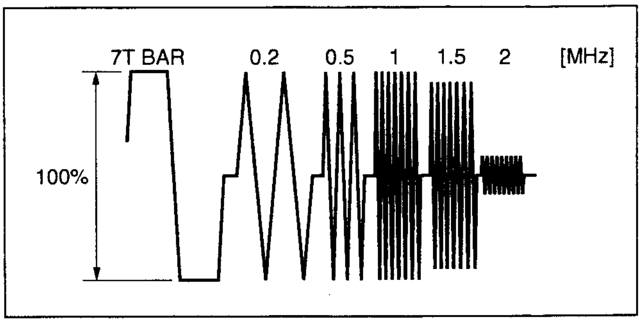
    Specifications (A and B channels):
    See the following table.

17. Watch the B-Y output signal on the analog component waveform monitor.
18. Also check the B-Y output signal levels as specified in steps 15 and 16.

    If it is out of the specifications, fine-adjust both R-Y and B-Y output signals until they are within the following specifications.
19. Eject the alignment tape.
    (F5 ⇨ EJECT ⇨ F6)
20. To exit A32 : COS EQ VR (METAL-C) , press the F6 (EXIT) button once.

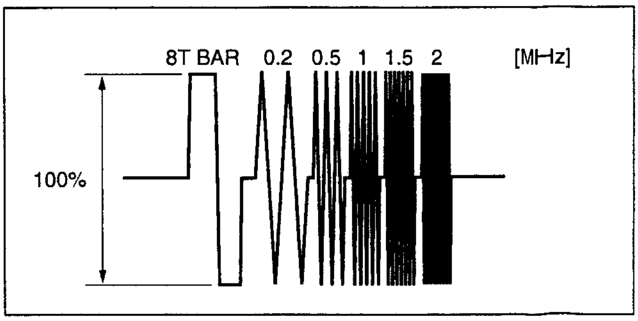
NTSC model Specifications (METAL C)

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
1 MHz	Adjust: 94% (100 to 89%) {–0.5 ±0.5 dB}
0.2 MHz 0.5 MHz	Check: 100% (106 to 63%) {0 $^{+0.5}_{-3.0}$ dB}
1.5 MHz	Check: 80% (106 to 71%) {–2.0 $^{+2.5}_{-1.0}$ dB}



PAL model Specifications (METAL C)

Frequency	Specification for PAL model (Level at 8T BAR is 100% {0 dB}.)
1.5 MHz	Adjust: 93% (102 to 85%) {–0.6 ±0.8 dB}
0.2 MHz 0.5 MHz 1 MHz	Check: 100% (106 to 71%) {0 $^{+0.5}_{-3.0}$ dB}
2 MHz	Check: 80% (106 to 71%) {–2.0 $^{+2.5}_{-1.0}$ dB}



OXIDE Y adjustment

21. Enter A33 : COS EQ VR (OXIDE-Y).
22. Watch the Y output signal on the analog component waveform monitor.

    Note

    As the Y output is overlapped the outputs of A channel and B channel on the analog component waveform monitor, adjust/check the level at each channel.

23. Measure the level at 0.5 MHz (NTSC model) / 2T BAR (PAL model) while playing back the alignment tape in PLAY mode.
    PB portion: Multi-burst signal (3:00 to 6:00) of CR5-2A / CR5-2A PS
    Use this measurement value as the reference level 100% (0 dB).
24. Adjust the level at 2 MHz (NTSC model) / 3 MHz (PAL model).
    PB portion: The same as step 23
    Adj. points:
    A channel: A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A
    B channel: A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B
    Specifications (A and B channels):
    See the following table.
25. Play back the alignment tape in PLAY mode. Check to see that each level at the other frequency parts is within the specifications.
    PB portion: The same as step 23
    Specifications (A and B channels):
    See the following table.
26. Play back the alignment tape in PLAY mode. Check to see that the output levels of A and B channels at high frequency (4.5 MHz) part are identical.
    PB portion: The same as step 23
    Specification: They are nearly identical.

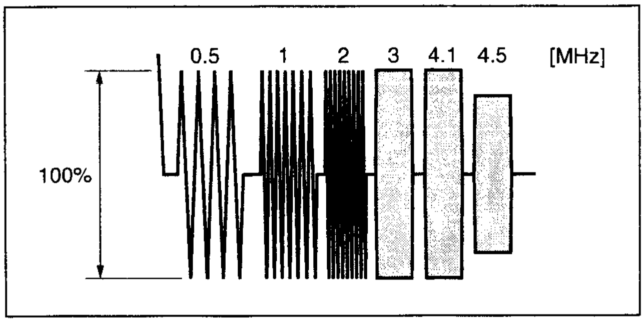
    Note

    If the difference is pronounced, adjust the data of "SUB OXIDE-Y-A" or "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) following steps (1) and (2) below.
    (1) Change the data of "SUB OXIDE-Y-A" (A channel side) to find which channel level is lower.
    (2) If the B channel side is lower, reset the data of "SUB OXIDE-Y-A" to the former data, then adjust the data of "SUB OXIDE-Y-B" until both levels at 4.5 MHz become nearly identical.
    If the A channel side is lower, adjust the data of "SUB OXIDE-Y-A" until both levels at 4.5 MHz become nearly identical.

27. To exit A33 : COS EQ VR (OXIDE-Y), press the F6 (EXIT) button once.

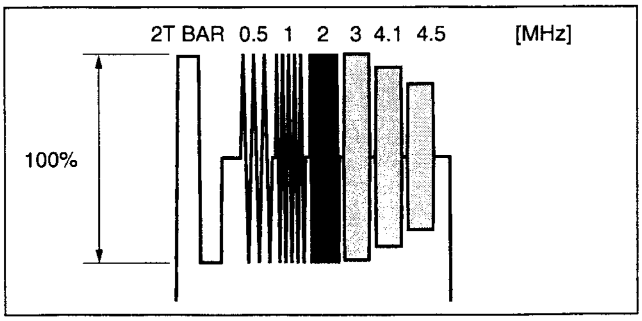
NTSC model Specifications (OXIDE Y)

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
2 MHz	Adjust: 100% (104 to 95%) {0 $^{+0.3}_{-0.4}$ dB}
1 MHz	Check: 100% (106 to 50%) {0 $^{+0.5}_{-6.0}$ dB}
3 MHz	Check: 89% (106 to 50%) {−1.0 $^{+1.5}_{-5.0}$ dB}
4.1 MHz	Check: 71% (106 to 50%) {−3.0 $^{+3.5}_{-3.0}$ dB}



PAL model Specifications (OXIDE Y)

Frequency	Specification for PAL model (Level at 2T BAR is 100% {0 dB}.)
3 MHz	Adjust: 89% (100 to 79%) {−1.0 ±1.0 dB}
0.5 MHz 1 MHz, 2 MHz	Check: 100% (106 to 50%) {0 $^{+0.5}_{-6.0}$ dB}
4.1 MHz	Check: 71% (106 to 50%) {−3.0 $^{+3.5}_{-3.0}$ dB}



OXIDE C adjustment

28. Enter A34 : COS EQ VR (OXIDE-C).
29. Watch the R-Y output signal at the analog component waveform monitor.

    Note

    As the R-Y (B-Y) output is overlapped the outputs of A channel and B channel on the analog component waveform monitor, adjust/check the level at each channel.

30. Measure level at 7T BAR (NTSC model) / 8T BAR (PAL model) while playing back the alignment tape in PLAY mode.

    PB portion: Multi-burst signal (3:00 to 6:00) of CR5-2A / CR5-2A PS

    Use this measurement value as the reference level 100% (0 dB).
31. Adjust the level at 1 MHz.

    PB portion: The same as step 30

    Adj. points:

    A channel: A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A

    B channel: A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B

    Specifications (A and B channels): See the following table.
32. Play back the alignment tape in PLAY mode, check each level at the other frequency parts.

    PB portion: The same as step 30

    Specifications (A and B channels): See the following table.
33. Watch the B-Y output signal on the analog component waveform monitor.
34. Also check the B-Y output signal levels as specified in steps 31 and 32.

    If it is out of the specifications, fine-adjust both R-Y and B-Y output signals until they are within the following specifications.
35. Stop the playback of the alignment tape.
36. To exit A34 : COS EQ VR (OXIDE-C), press the F6 (EXIT) button once.

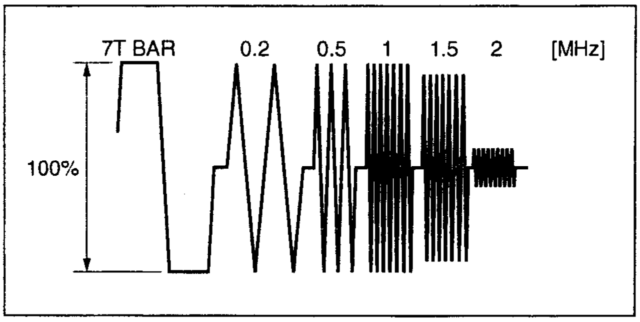
Saving the Data

37. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

38. Exit the maintenance mode.

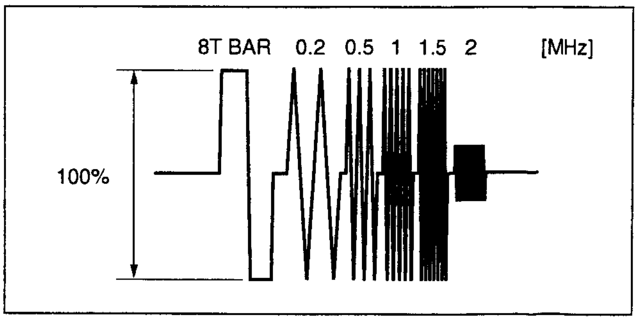
NTSC model Specifications (OXIDE C)

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
1 MHz	Adjust: 94% (100 to 89%) {−0.5 ±0.5 dB}
0.2 MHz	Check: 100% (106 to 71%) {0 $^{+0.5}_{-3.0}$ dB}
0.5 MHz	Check: 95% (106 to 71%) {−0.4 $^{+0.9}_{-2.6}$ dB}
1.5 MHz	Check: 80% (106 to 71%) {−2.0 $^{+2.5}_{-1.0}$ dB}



PAL model Specifications (OXIDE C)

Frequency	Specification for PAL model (level at 8T BAR is 100% {0 dB}.)
1 MHz	Adjust: 94% (102 to 86%) {−0.5 ±0.8 dB}
0.2 MHz 0.5 MHz	Check: 100% (106 to 71%) {0 $^{+0.5}_{-3.0}$ dB}
1.5 MHz	Check: 84% (106 to 71%) {−1.5 $^{+2.0}_{-1.5}$ dB}



7-2-15. DM RF Output Level Readjustment (Analog Betacam)

Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

Readjust the DM RF output level referring to Section 7-2-10 again.

7-2-16. RF Envelope Adjustment (Analog Betacam)

Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

Alignment tape:

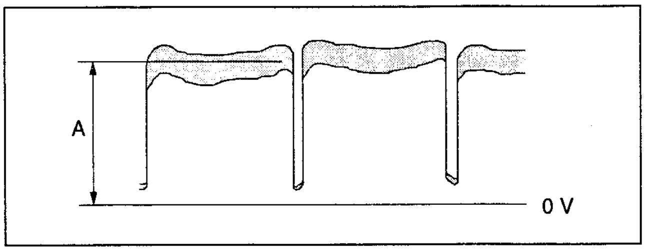
for NTSC model:	CR5-1B
for PAL model:	CR5-1B PS

Measuring equipment: Oscilloscope

1. Turn off the power.
2. Extend the DM-123 board using the extension board EX-739.
3. Turn on the power.

Y adjustment

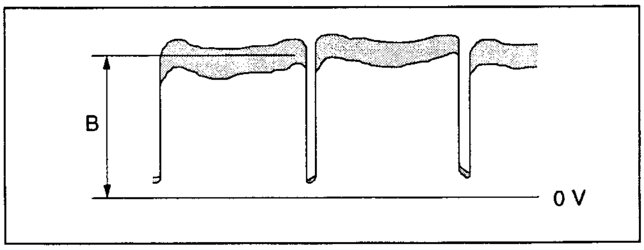
4. Connect and set the oscilloscope as follows:
   CH-1: TP112/DM-123(N-5), DC 500 mV/DIV
   GND: E101/DM-123(P-6)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 5 ms/DIV
   TRIG: CH-2, – slope
5. Adjust the DC level at CH-1 on the oscilloscope while playing back the alignment tape in PLAY mode.
   PB portion: Flat filed signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV113/DM-123(N-5)
   Specification: A = 2.0 ±0.2 V dc



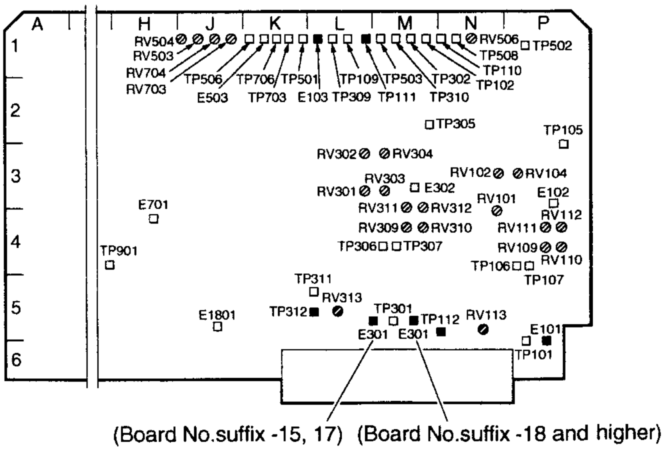
6. Stop the playback of the alignment tape.

C adjustment

7. Change the connection of the oscilloscope CH-1 only as follows: (Keep the setting of the oscilloscope and CH-2 connection.)
   CH-1: TP312/DM-123(L-5)
   GND: E301/DM-123(M-5)
8. Adjust the DC level at CH-1 on the oscilloscope while playing back the alignment tape in PLAY mode.
   PB portion: Flat filed signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV313/DM-123(L-5)
   Specification: B = 2.0 ±0.2 V dc



9. Stop the playback of the alignment tape.


A
H
J
K
L
M
N
P
1
2
3
4
5
6
RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP310
TP302
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV112
RV311
RV312
RV309
RV310
RV111
RV109
RV110
TP306
TP307
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

7-2-17. Impact Error Offset Adjustment (Analog Betacam)

Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

Alignment tape:
for NTSC model: CR5-1B
for PAL model: CR5-1B PS

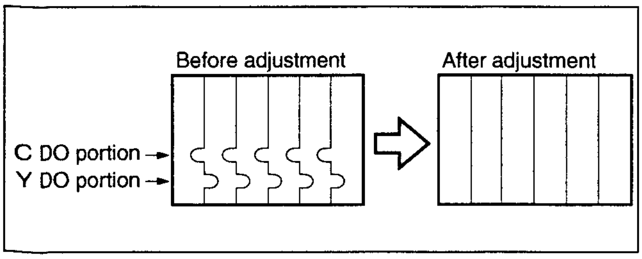
Measuring equipment: Video monitor

1. Turn off the power.
2. Reattach the DM-123 board without the extension board.
3. Turn on the power.
4. Set the F4 (CHARA) of the function menu Page4 to OFF.

   Note

   As to the following operations in the maintenance mode, operate while following the menu display on the lower control panel.

5. Enter the maintenance mode.
6. Enter A41 : LVL/IMP/PHASE VR.
   MAINTENANCE MODE → M1 : ADJUST → A4 : BETACAM PB (TBC) → A41 : LVR/IMP/PHASE VR
7. Play back the color-bar signal with the drop-out portion (26:00 to 28:00) of the alignment tape CR5-1B/CR5-1B PS in PLAY mode.
8. Check that the Y DO and C DO parts of playback picture (displaying color-bar) appear clearly with no drop-out.
   If drop-out is appeared, adjust the following RVs.
   Adj. points: Y DO: A41 : LVL/IMP/PHASE VR :
   IMP OFFSET-Y
   (IMP EER - IMP Y)
   C DO: A41 : LVL/IMP/PHASE VR :
   IMP OFFSET-C
   (IMP EER - IMP C)
   Specification: No dorp-out (on C DO and Y DO)



9. Stop the playback of the alignment tape.
10. To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.

Saving the Data

11. Enter A4F : NV-RAM CONTROL, then execute "SAVE"(SAVE ALL ADJUST DATA).
    - Message "DATA SAVED" will be displayed in the menu screen when this data save is completed normally.

12. Exit the maintenance mode.
13. Reset the F4 (CHARA) of the function menu on Page4 to ON.

7-2-18. TBC Y/C Delay Adjustment (Analog Betacam)

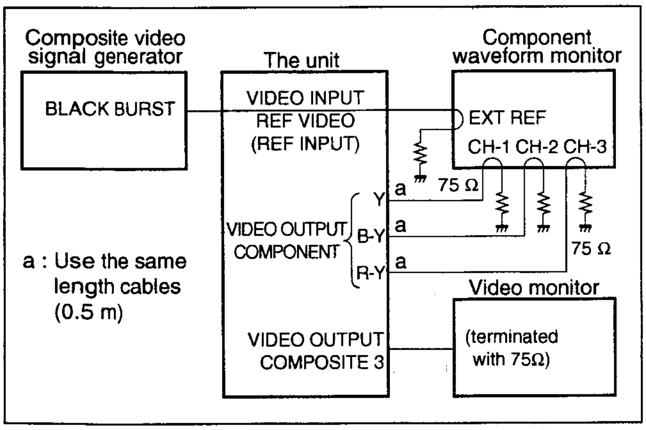
Notes

- The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- Be sure to perform this adjustment without using the extension board.

Alignment tapes:
for NTSC model: CR5-1B and CR5-2A
for PAL model: CR5-1B PS and CR5-2A PS

Measuring equipment:
Analog composite signal generator
Analog component waveform monitor

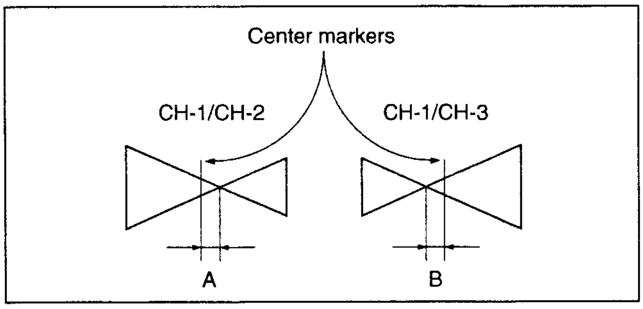
1. Connect the equipment as follows:


Composite video signal generator
BLACK BURST
The unit
VIDEO INPUT
REF VIDEO
(REF INPUT)
VIDEO OUTPUT COMPONENT
Y
B-Y
R-Y
VIDEO OUTPUT COMPOSITE 3
Component waveform monitor
EXT REF
CH-1 CH-2 CH-3
a
a
a
75 Ω
75 Ω
Video monitor
(terminated with 75Ω)
a : Use the same length cables (0.5 m)

2. Set the waveform monitor to BOWTIE mode.
3. Enter the maintenance mode.

METAL adjustment

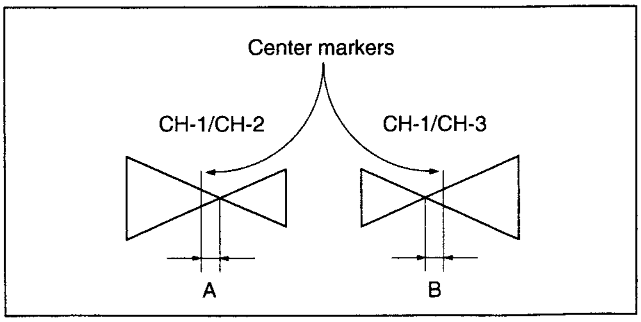
4. Enter A42 : YC DL VR (in NTSC model) or YC DL/Y TR VR (in PAL model).
   MAINTENANCE MODE → M1 : ADJUST → A4 : BETACAM PB (TBC) → A42 : YC DL VR or YC DL/Y TR VR
5. Play back the 50 % bowtie signal portion (17:00 to 19:00) of the alignment tape CR5-1B/CR5-1B PS in PLAY mode.
6. Adjust the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. points:
   Field 1: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-A
   Field 2: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-B
   Specifications: A = 0 ± 10 ns
   B = 0 ± 10 ns


Center markers
CH-1/CH-2
CH-1/CH-3
A
B

7. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

OXIDE adjustment

8. Play back the 50 % bowtie signal portion (6:00 to 9:00) of the alignment tape CR5-2A/CR5-2A PS in PLAY mode.
9. Adjust the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. point: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY O-A
   A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY O-B
   Specifications: A = 0 ± 10 ns
   B = 0 ± 10 ns

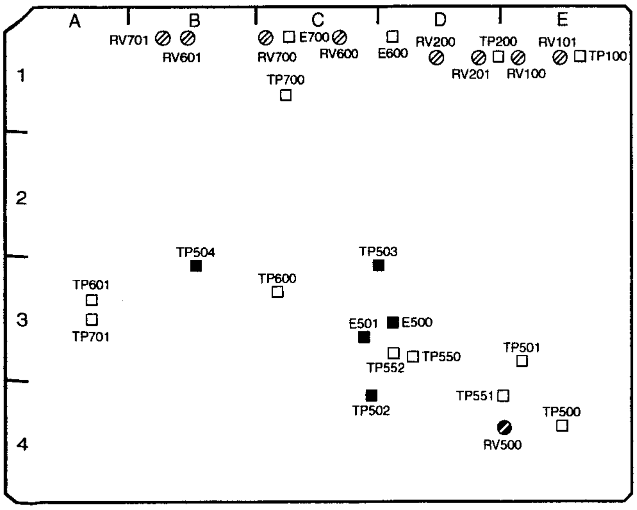

Center markers
CH-1/CH-2
CH-1/CH-3
A
B

10. Stop the playback of the alignment tape.
11. To exit A42 : YC DL VR or YC DL/Y TR VR, press the F6 (EXIT) button once.

Saving the Data

12. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "DATA SAVED" will be displayed in the menu screen when this data save is completed normally.

13. Exit the maintenance mode.
14. Eject the alignment tape.


A
B
C
D
E
1
2
3
4
RV701
RV601
RV700
E700
RV600
E600
RV200
TP200
RV101
TP100
RV201
RV100
TP700
TP504
TP503
TP601
TP600
TP701
E501
E500
TP552
TP550
TP501
TP502
TP551
TP500
RV500

AU-272 Board (Side A)

7-2-19. AFM RF Level Adjustment (Betacam SP)

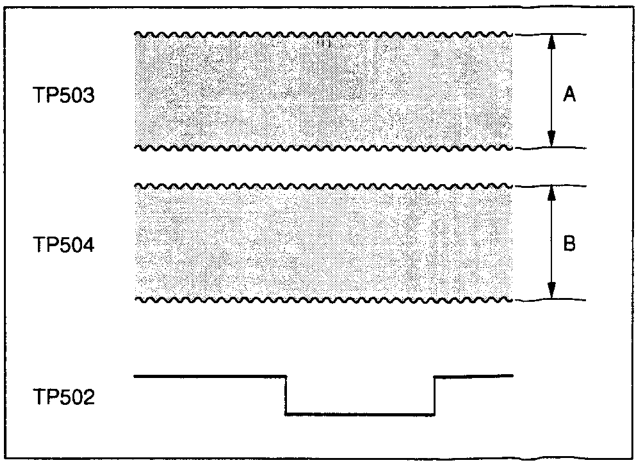
Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

Alignment tape:
NTSC model: CR5-1B
PAL model: CR5-1B PS

Measuring equipment: Oscilloscope

1. Turn off the power.
2. Extend the AU-272 board with extension board EX-739.
3. Connect and set the oscilloscope as follows:
   Band width limit: ON (20 MHz)
   CH-1: TP503/AU-272(C-3)
   GND: E500/AU-272(D-3)
   CH-2: TP504/AU-272(B-3)
   GND: E501/AU-272(C-3)
   TRIG: TP502/AU-272(C-4)
   GND: E501/AU-272(C-3)
   TIME: 5 ms/DIV
4. Turn on the power.
5. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B/CR5-1B PS in PLAY mode.
6. Check to see that the RF levels of waveforms on the oscilloscope are within the specifications.
   If it is out of the specifications, adjust it.
   Adj. point: ⊘RV500/AU-272(E-4)
   Specifications: A = 450 ± 100 mV p-p
   B = 450 ± 100 mV p-p


TP503
A
TP504
B
TP502

7. Eject the alignment tape.
8. Turn off the power.
9. Reattach the AU-272 board without the extension board.

7-3. Electrical Adjustment after Replacing the AT Head

7-3-1. Adjustment Overview

Perform this section when the AT head was replaced.

For adjustment items and its order, refer to “Adjustment Items” on next page.

Tools

The following equipment (or equivalent) and fixtures are required:

Tools	Type	Part No.	HDW-			DVW-		MSW-			
			2000 D2000	M2000/P S2000/P	M2100/P	2000/P	M2000/P	2000	A2000/P	M2000/P M2000E/P	M2100/P M2100E/P
Audio analyzer	Audio Precision System One or System Two or Tektronix AA501A-option 02		O	O	O	O	O	O	O	O	O

Note
The audio analyzer should be filtered through 80 kHz LPF throughout adjustment.

Tools	Type	Part No.	HDW- 2000 D2000	HDW- M2000/P S2000/P	HDW- M2100/P	DVW- 2000/P	DVW- M2000/P	MSW- 2000	MSW- A2000/P	MSW- M2000/P M2000E/P	MSW- M2100/P M2100E/P
Audio signal generator	Tektronix SG5010		O	O	—	O	O	O	O	O	—
Audio level meter	Hewlett-Packard HP3400A		O	O	O	O	O	O	O	O	O
Oscilloscope	Tektronix TDS460A		O	O	O	O	O	O	O	O	O
Frequency counter	Advantest TR5821		O	O	—	O	O	—	—	—	—
Time code generator	Sony BVG-1600		O	N	—	N	N	N	N	N	—
			or								
	Sony BVG-1600PS		O	P	—	P	P	P	P	P	—
Time code reader	Sony BVG-1500		O	N	—	N	N	N	N	N	—
			or								
	Sony BVG-1500PS		O	P	—	P	P	P	P	P	—
Bandpass filter (1 kHz)			O	O	—	O	O	O	O	O	—
Shorting clip			O	O	O	O	O	—	—	O	O
Analog composite video monitor			O	O	O	O	O	O	O	O	O

Note
Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT 3 (SUPER) connector.

Tools	Type	Part No.	HDW- 2000 D2000	HDW- M2000/P S2000/P	HDW- M2100/P	DVW- 2000/P	DVW- M2000/P	MSW- 2000	MSW- A2000/P	MSW- M2000/P M2000E/P	MSW- M2100/P M2100E/P
Extension board	EX-739	A-8324-911-A	—	O	O	—	O	—	O	O	O
	EX-797	A-8327-683-A	O	O	O	O	O	—	—	O	O

O: Required N: Required for NTSC model P: Required for PAL model —: Not required

(Continued)

Tools	Type	Part No.	HDW-			DVW-		MSW-			
			2000 D2000	M2000/P S2000/P	M2100/P	2000/P	M2000/P	2000	A2000/P	M2000/P M2000E/P	M2100/P M2100E/P
Alignment Tapes	HR5-1A	8-960-076-01	○	○	○	—	—	—	—	—	—
	ZR5-1	8-960-073-01	—	—	—	N	N	—	—	N	N
	ZR5-1P	8-960-073-51	—	—	—	P	P	—	—	P	P
	MR5-1	8-960-077-01	—	—	—	—	—	N	N	N	N
	MR5-1P	8-960-077-51	—	—	—	—	—	P	P	P	P
	CR8-1A	8-960-097-45	—	N	N	—	N	—	N	N	N
	CR8-1A PS	8-960-098-45	—	P	P	—	P	—	P	P	P
	CR8-1B PS	8-960-096-85	—	P	P	—	P	—	P	P	P
Recorded tape	Sony BCT-SP (Betacam SP cassette)		—	○	○	○	○	—	○	○	○

Note

Be sure to record no signal to the LAU tracks with a Betacam SP videocassette recorder in advance.

Tools	Type	Part No.	HDW-			DVW-		MSW-			
			2000 D2000	M2000/P S2000/P	M2100/P	2000/P	M2000/P	2000	A2000/P	M2000/P M2000E/P	M2100/P M2100E/P
Recording tape	Sony BCT-HD (HDCAM cassette)		○	○	○	—	—	—	—	—	—
	Sony BCT-D (Digital Betacam cassette)		—	—	—	○	○	—	—	—	—
	Sony BCT-MX (MPEG IMX cassette)		—	—	—	—	—	○	○	○	○

Notes

- Use a new blank tape or no recorded tape that has been erased with a tape eraser in advance for recorder adjustments.
- Be sure to record normal time codes on a different VTR with the same format in advance for player adjustments.

○: Required N: Required for NTSC model P: Required for PAL model —: Not required

Adjustments

Notes

- Section 7-3-3 is not necessary for the models (HDW-2000/D2000, DVW-2000/P and MSW-2000) with no playback function of analog Betacam.
- There are two "Time code system adjustment" sections: for recorder (Section 7-3-4) and for player (Section 7-3-7).
- The CUE system adjustments consist of the playback system adjustment (Section 7-3-5) for HDW/DVW/MSW-M series and the recording system adjustment (Section 7-3-6) for HDW/DVW recorder.

No.	Item			Adjustment point	Test point
7-3-2	Preparation				
7-3-3	LAU PB System Adjustment (For models other than HDW-2000/D2000, DVW-2000/P and MSW-2000)				
	1. LAU PB Frequency Response Adjustment (Audio head dumping adjustment)				
		OXIDE	CH1	⊘RV101/AE-31 ⊘RV100/AE-31 [S100/AE-31]	AUDIO OUTPUT CH1
			CH2	⊘RV201/AE-31 ⊘RV200/AE-31 [S200/AE-31]	AUDIO OUTPUT CH2
		METAL (PAL model only)	CH1	⊘RV102/AE-31	AUDIO OUTPUT CH1
			CH2	⊘RV202/AE-31	AUDIO OUTPUT CH2
	2. LAU Dolby Level Adjustment		CH1	⊘RV100/AU-272 ⊘RV103/AE-31	TP100/AU-272 TP100/AU-31
			CH2	⊘RV200/AU-272 ⊘RV203/AE-31	TP200/AU-272 TP202/AU-31
	3. LAU PB Level Adjustment		CH1	⊘RV101/AU-272	AUDIO OUTPUT CH1
			CH2	⊘RV201/AU-272	AUDIO OUTPUT CH2
	4. LAU PB Phase Adjustment			⊘RV205/AE-31	AUDIO OUTPUT CH1/CH2
7-3-4	Time Code System Adjustment (for recorder only)				
	1. TC Insert Cross-talk Adjustment (for recorders excluding MSW-2000)		CH1	⊘RV700/AE-31	AUDIO OUTPUT CH1 ⊘RV702/AE-31
			CH2	⊘RV701/AE-31 ⊘RV703/AE-31	AUDIO OUTPUT CH2
	2. LTC Erasure Current Adjustment			⊘LV200/TC-104	TP201/TC-104, E100/TC-104
	3. LTC PB Level Check			check	TP102/TC-104
	4. LTC OA Check			check	TP100/TC-104, TP102/TC-104
	5. LTC Erase Ratio Check			check	TP102/TC-104
7-3-5	CUE PB System Adjustment (for HDW/DVW/MSW-M series only)				
	1. CUE PB Frequency Response Adjustment			⊘RV203/AE-31	CUE OUT
	2. CUE PB Level Adjustment			⊘RV300/AE-31	TP102/CUE-13
7-3-6	CUE REC System Adjustment (for HDW recorder only)				
	1. CUE Erasure Current Adjustment			⊘LV600/AE-31	TP601/AE-31
	2. CUE Bias Frequency Adjustment			⊘T500/AE-31	TP500/AE-31
	3. CUE Bias Trap Adjustment			⊘LV400/AE-31	TP401/AE-31
	4. CUE Bias Current Adjustment			⊘RV500/AE-31	TP200/AE-31
	5. CUE REC Frequency Response Adjustment			⊘RV401/AE-31	CUE OUT
	6. CUE REC Level Adjustment			⊘RV400/AE-31	CUE OUT
7-3-7.	Time Code System Adjustment (for player only)				
	1. LTC Erasure Current Adjustment			⊘LV200/TC-104	TP201/TC-104
	2. TC Insert Cross-talk Adjustment		CH1	⊘RV700/AE-31 ⊘RV702/AE-31	AUDIO OUTPUT CH1
			CH2	⊘RV701/AE-31 ⊘RV703/AE-31	AUDIO OUTPUT CH2
	3. LTC PB Level Check			check	TP102/TC-104

The following are adjustments required by each model.

Item	HDW-			DVW-		MSW-			
	2000 D2000	M2000/P S2000/P	M2100/P	2000/P	M2000/P	2000	A2000/P	M2000/P M2000E/P	M2100/P M2100E/P
7-3-3 LAUPB System Adjustment	—	○	○	—	○	—	○	○	○
7-3-4 Time Code System Adjustment (for recorder)	○	○	—	○	○	○	○	○	—
7-3-5 CUE PB System Adjustment	○	○	○	○	○	—	—	○	○
7-3-6 CUE REC System Adjustment	○	○	—	○	○	—	—	—	—
7-3-7 Time Code System Adjustment (for player)	—	—	○	—	—	—	—	—	○

7-3-2. Preparation

Set the switches, function menu, and others specified before starting the adjustments.
After completing all the adjustments, be cure to reset them to the customer settings.

1. After turning off the power, reset the DIP switches of APR-52 board and CUE-13 board to the factory settings.

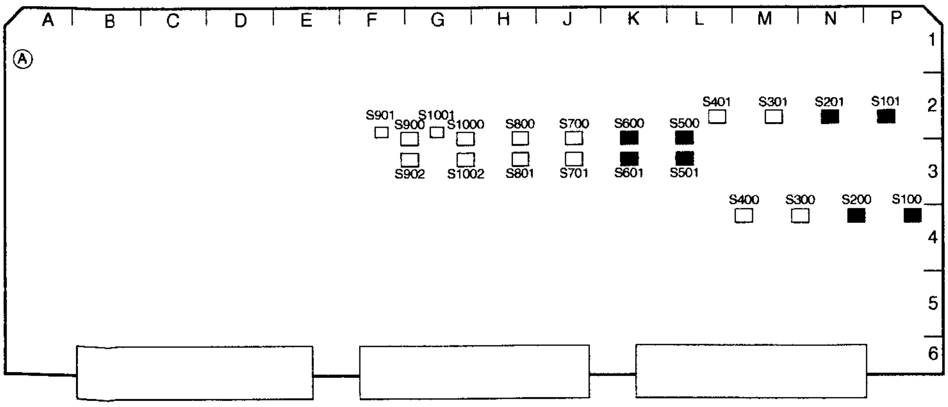
Note

[R]: For recorder only

Board	Ref. No. (Address)	Item	Customer setting		Factory setting
APR-52	[R] S100 (P-4)	Analog audio CH1 input level	____________	⇨	+4 (Bit-1only/ON)
	S101 (P-2)	Analog audio CH1 input headroom	____________	⇨	20 (Bit-1only/ON)
	[R] S200 (N-4)	Analog audio CH2 input level	____________	⇨	+4 (Bit-1only/ON)
	S201 (N-2)	Analog audio CH2 input headroom	____________	⇨	20 (Bit-1only/ON)
	S500 (L-2)	Analog audio CH1 output headroom	____________	⇨	20 (Bit-1only/ON)
	S501 (L-3)	Analog audio CH1 output level	____________	⇨	+4 (Bit-1only/ON)
	S600 (K-2)	Analog audio CH2 output headroom	____________	⇨	20 (Bit-1only/ON)
	S601 (K-3)	Analog audio CH2 output level	____________	⇨	+4 (Bit-1only/ON)
CUE-13*1	[R] S100 (C-1)	CUE input level	____________	⇨	+4/ON, others/OFF
	S101 (A-2)	CUE output level	____________	⇨	+4/ON, others/OFF

*1 : This is not in MSW-2000/A2000/A2000P.

2. **For DVW series and MSW series:**
   Set the Bit-1 of the DIP switch S1502 (B-1) on the SS-89 board to ON (upper) to enable the operation of the setup extended menu. (S1502-1 customer setting : ☐ ON ☐ OFF)
   Note
   This switch is set to ON at the factory shipping for HDW series.
3. **All models but HDW-2000/D2000, DVW-2000/P and MSW-2000:**
   Extend the AU-272 board with an extension board EX-739.
4. Open the AE-31 board. (Refer to Section 5-1-2.)
   Note
   In the case of MSW-2000, skip this step because the AE-31 board is not mounted.
5. Turn on the power.
6. Check that this unit is set to the standard mode for HDW/MSW series.
   If it does not, change the setting of the setup menu ITEM-013.
   (Refer to the operation manual.)
   NTSC model: 59.94 Hz or 525 mode
   PAL model: 50 Hz or 625 mode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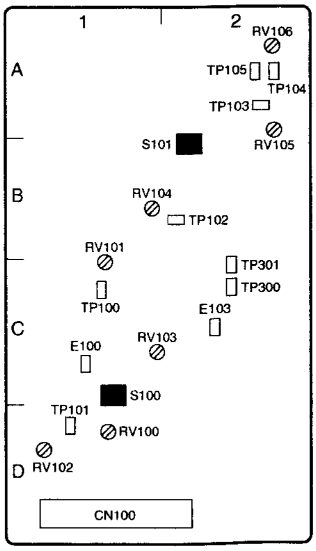
S900
S1001
S1000
S800
S700
S600
S500
S401
S301
S201
S101
S902
S1002
S801
S701
S601
S501
S400
S300
S200
S100

APR-52 Board (Side A)


1
2
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C
D
RV106
TP105
TP104
TP103
S101
RV105
RV104
TP102
RV101
TP301
TP300
TP100
E103
RV103
E100
S100
TP101
RV100
RV102
CN100

CUE-13 Board (Side A)

7. Set the VTR's switches and function menu as follows:

Note

R: For recorder only

Location	Item		Customer setting		Setting at adjustment
Switch panel	KEY INHIBIT switch		______	⇨	OFF
Upper control panel	REMOTE	1 (9P)	______	⇨	OFF (Light off)
		2 (50P)	______	⇨	OFF (Light off)
Lower control panel	PB controls	CH1	______	⇨	PRESET
		CH2	______	⇨	PRESET
		CH8	______	⇨	PRESET
Function menu	Page1	R F1 (TCG)	______	⇨	INT
		R F2 (TCG)	______	⇨	REGEN
		R F3 (RUN)	______	⇨	REC RUN
		F6 (TCR)	______	⇨	LTC
	Page4	F3 (DOLBY)	______	⇨	NR OFF
		F4 (CHARA)	______	⇨	ON
		F5 (RECINH)	______	⇨	OFF

7-3-3. LAU PB System Adjustment

Note

The adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

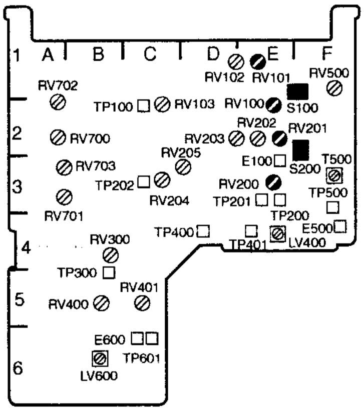
1. LAU PB Frequency Response Adjustment

Alignment tape(s):
for NTSC model: CR8-1A
for PAL model: CR8-1A PS and CR8-1B PS

Note

The LAU PB frequency response adjustment using a metal tape is not required in NTSC model.

Measuring equipment: Audio analyzer



AE-31 Board (Side A)

1. Set the audio analyzer as follows:
   Function mode: dB RATIO
   Input filter: 80 kHz LPF

CH1 adjustment (OXIDE)

2. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
3. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the CR8-1A / CR8-1A PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
4. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1A / CR8-1A PS in PLAY mode.

   Note

   If the adjustment with RV100 becomes out of the specification, change the setting of S100 (F-1) on the AE-31 board, and then retry it.

CH2 adjustment (OXIDE)

5. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
6. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the CR8-1A / CR8-1A PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
7. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1A / CR8-1A PS in PLAY mode.

   Note

   If the adjustment with RV200 becomes out of the specification, change the setting of S200 (F-3) on the AE-31 board, and then retry it.

	Specification [dB]		Adjustment point	
Playback portion	**NTSC model**	**PAL model**	**CH-1**	**CH-2**
5:00 to 5:55 (1 kHz)	Measured audio level is a reference level (0 dB).		—	
6:00 to 6:25 (40 Hz)	C.V. $^{+0.7}_{-1.7}$	C.V. $^{+0.7}_{-1.7}$	(Check only)	(Check only)
6:30 to 6:55 (7 kHz)	C.V. ±0.3	C.V. ±0.4	⊘RV101/AE-31 (E-1)	⊘RV201/AE-31 (E-2)
7:00 to 7:25 (10 kHz)	C.V. ±0.3	C.V. ±0.4	(Check only)	(Check only)
7:30 to 7:55 (15 kHz)	C.V. $^{+0.3}_{-1.0}$	C.V. $^{-0.5}_{-1.7}$	⊘RV100/AU-260 (B-1)	⊘RV200/AE-31 (E-3)

The correction values (C.V.) are given on the label of the alignment tape.

CH1 adjustment (METAL) for PAL model only

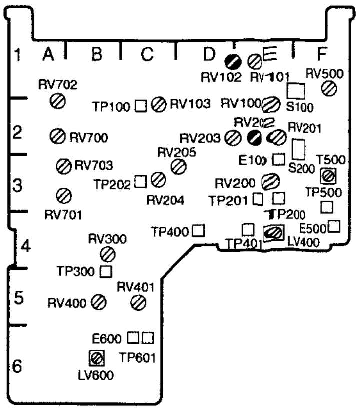
8. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
9. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the alignment tape CR8-1B PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
10. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1B PS in PLAY mode.

CH2 adjustment (METAL) for PAL model only

11. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
12. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the CR8-1B PS in PLAY mode, and then measure the audio level on the audio analyzer.
    Use this measurement value as the reference level (0 dB).
13. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1B PS in PLAY mode.

Playback portion	Specification [dB]	Adjustment point
5:00 to 5:55 (1 kHz)	Measured audio level is a reference level (0 dB).	—
6:00 to 6:25 (40 Hz)	C.V. $^{+0.7}_{-1.7}$	(Check only)
6:30 to 6:55 (7 kHz)	C.V. ±0.3	(Check only)
7:00 to 7:25 (10 kHz)	C.V. ±0.4	(Check only)
7:30 to 7:55 (15 kHz)	C.V. ±0.5	CH-1: ●RV102/AE-31(D-1) CH-2: ●RV202/AE-31(E-2)

The correction values (C.V.) are given on the label of the alignment tape.


1
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5
6
RV702
RV102
RV101
RV500
TP100
RV103
RV100
S100
RV202
RV201
RV700
RV203
RV205
E100
S200
T500
RV703
TP202
RV200
TP500
RV204
TP201
RV701
TP200
TP400
E500
RV300
TP401
LV400
TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

2. LAU Dolby Level Adjustment

Alignment tape:
for NTSC model: CR8-1A
for PAL model: CR8-1B PS

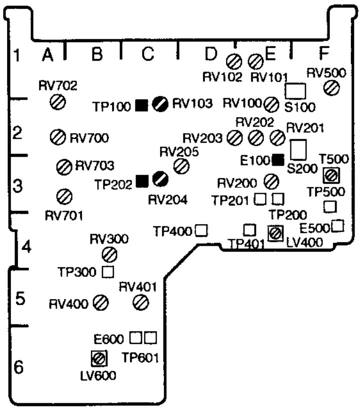
Measuring equipment: Audio level meter

CH1 adjustment

1. Connect the audio level meter to TP100 (C-2) on the AE-31 board. GND: E100/AE-31 (E-3)
2. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A/CR8-1B PS in PLAY mode.
3. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV103/AE-31(C-2)
   Specification: −10.0 ±0.1 dBu (0 dBu ≒ 0.775 V rms)
4. Connect the audio level meter to TP100(E-1) on the AU-272 board.
   GND: E3/AU-272(E-3) or E600/AU-272(C-1)
5. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A/CR8-1B PS in PLAY mode.
6. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV100/AU-272(E-1)
   Specification: −10.0 ±0.1 dBu (0 dBu ≒ 0.775 V rms)

CH2 adjustment

7. Connect the audio level meter to TP202 (C-3) on the AE-31 board. GND: E100/AE-31 (E-3)
8. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A/CR8-1B PS in PLAY mode.
9. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV204/AE-31 (D-3)
   Specification: −10.0 ±0.1 dBu (0 dBu ≒ 0.775 V rms)
10. Connect the audio level meter to TP200(D-1) on the AU-272 board.
    GND: E3/AU-272(E-3) or E600/AU-272(C-1)
11. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS in PLAY mode.
12. Adjust the audio level on the audio level meter.
    Adj. point: ⊘RV200/AU-272(D-1)
    Specification: −10.0 ±0.1 dBu (0 dBu ≒ 0.775 V rms)


1
A
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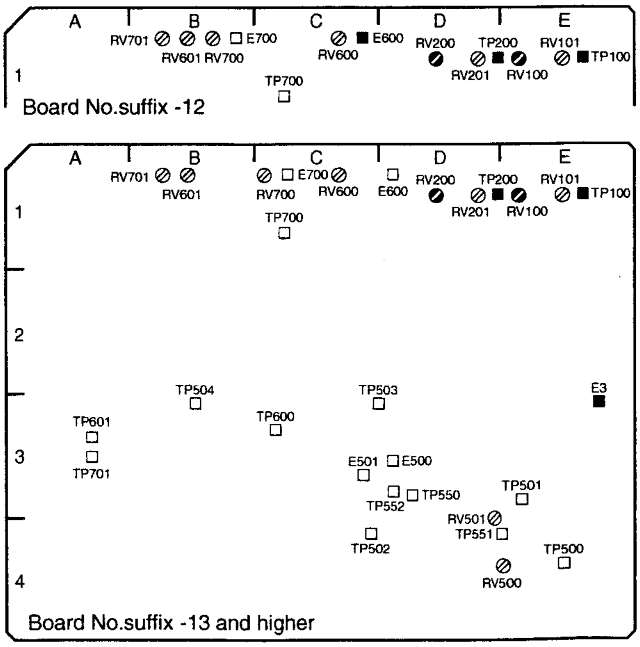
F
RV102
RV101
RV500
RV702
S100
TP100
RV103
RV100
2
RV700
RV202
RV201
RV203
RV205
RV703
E100
S200
T500
3
TP202
RV200
RV204
TP201
TP500
RV701
TP200
TP400
E500
4
RV300
TP401
LV400
TP300
RV401
5
RV400
E600
TP601
6
LV600

AE-31 Board (Side A)


A
B
C
D
E
RV701
E700
E600
RV200
TP200
RV101
RV601
RV700
RV600
TP100
1
TP700
RV201
RV100
Board No.suffix -12
A
B
C
D
E
RV701
E700
RV200
TP200
RV101
RV601
RV700
RV600
E600
TP100
1
TP700
RV201
RV100
2
TP504
TP503
E3
TP601
TP600
3
TP701
E501
E500
TP501
TP552
TP550
RV501
TP551
TP502
TP500
4
RV500
Board No.suffix -13 and higher

AU-272 Board (Side A)

3. LAU PB Level Adjustment

Alignment tape:
for NTSC model: CR8-1A
for PAL model: CR8-1B PS

Measuring equipment: Audio analyzer

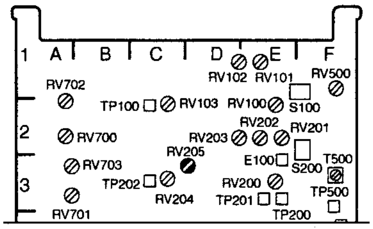
1. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH2 adjustment

2. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
3. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A/CR8-1B PS in PLAY mode.
4. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV201/AU-272(D-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A/CR8-1B PS in PLAY mode.
7. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV101/AU-272(E-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)


1
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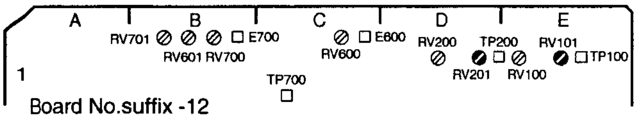
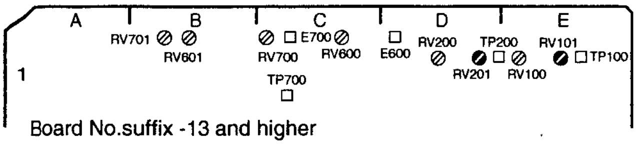
RV102
RV101
RV500
RV702
TP100
RV103
RV100
S100
RV202
RV201
RV700
RV203
RV205
E100
S200
T500
RV703
TP202
RV200
TP500
RV701
RV204
TP201
TP200

AE-31 Board (Side A)


A
B
C
D
E
1
RV701
E700
E600
RV200
TP200
RV101
RV601
RV700
RV600
TP100
RV201
RV100
TP700

Board No.suffix -12


A
B
C
D
E
1
RV701
E700
RV200
TP200
RV101
RV601
RV700
RV600
E600
TP100
RV201
RV100
TP700

Board No.suffix -13 and higher

AU-272 Board (Side A)

4. LAU PB Phase Adjustment

Alignment tape:
for NTSC model: CR8-1A
for PAL model: CR8-1B PS

Measuring equipment: Oscilloscope

1. Connect and set the oscilloscope as follows:
   X-Y mode
   CH-1: Pin 2 (X) of AUDIO OUTPUT CH1 connector
   GND: Pin 1 (G) of it, AC
   CH-2: Pin 2 (X) of AUDIO OUTPUT CH2 connector
   GND: Pin 1 (G) of it, AC

   Note

   An XLR-to-pigtail cable is very convenient to connect between the oscilloscope and the above-mentioned connectors.
   Prepare two XLR-to-pigtail cables for this adjustment. And connect the XLR plug end of the cable to above-mentioned connectors and the pigtailed end to the oscilloscope. The cables for CH-1 and CH-2 shall be the same in length and same wire color on the pigtailed end.
2. **For NTSC model:**
   Play back the 10 kHz, −10 VU portion (3:00 to 4:55) of the alignment tape CR8-1A in PLAY mode.
   For PAL model:
   Play back the 15 kHz, 0 VU portion (3:00 to 4:55) of the alignment tape CR8-1B PS in PLAY mode.
3. Watch the lissajous waveform on the oscilloscope.
4. Align the vertical and horizontal amplitudes of lissajous waveform to 60 mm square with the VOLTS/DIV and VAR controls of the oscilloscope.
5. Minimize the phase difference A of lissajous waveform.
   Adj. point: ⊘RV205/AE-31(D-3)
   Specification: A ≦ 5.2 mm (Refer to Figure 1.)

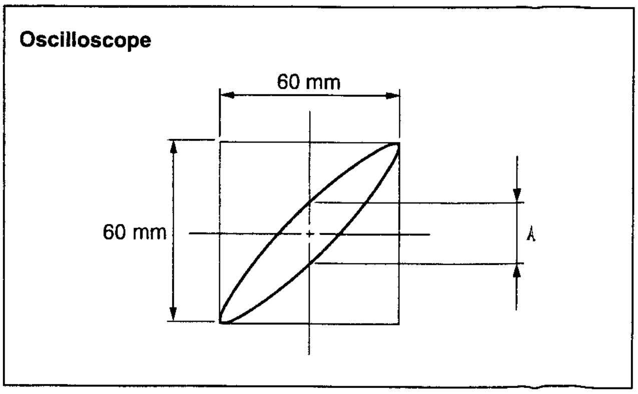

Oscilloscope
60 mm
60 mm
A

Figure 1. Lissajous Waveform of LAU PB Phase Adjustment

7-3-4. Time Code System Adjustment (for Recorder Only)

1. TC Insert Cross-talk Adjustment

Note

In the case of MSW-2000, skip this adjustment because the AE-31 board is not mounted.

Measuring equipment: Audio analyzer

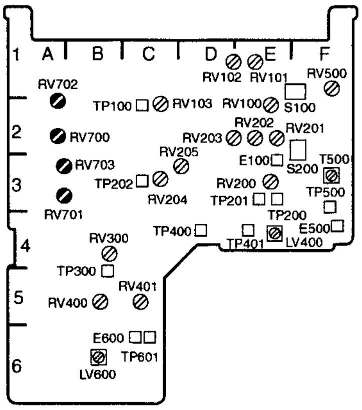
1. Set the setup extended menu ITEM-F15 to "ALL".
   (Customer setting: ☐ LIMIT ☐ ALL)
2. Open the AUDIO INPUT CH1 and CH2 connectors.
3. Insert the Betacam SP cassette tape on which no signal is recorded to the LAU tracks.
4. Set the audio analyzer as follows:
   Function mode: LEVEL
   Input filter: 80 kHz LPF

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Press the INSERT TC (time code) button on the lower control panel.
7. Press the PLAY button while pressing the EDIT button.
8. Adjust the cross-talk level on the audio analyzer.
   (Alternately adjust the following adj. points.)
   Adj. points: ⊘RV700/AE-31(A-2)
   ⊘RV702/AE-31(A-2)
   Specification: Minimize
   (The level should be less than −18 dBu)
9. Stop recording.

CH2 adjustment

10. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
11. Press the INSERT TC (time code) button on the lower control panel.
12. Press the PLAY button while pressing the EDIT button.
13. Adjust the cross-talk level on the audio analyzer.
    (Alternately adjust the following adj. points.)
    Adj. points: ⊘RV701/AE-31(A-3)
    ⊘RV703/AE-31(A-3)
    Specification: Minimize
    (The level should be less than −18 dBu)
14. Stop recording, then eject the cassette tape.
15. Reset the setup extended menu ITEM-F15 to the customer setting.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RV702
RV102
RV101
RV500
TP100
RV103
RV100
S100
RV202
RV201
RV700
RV203
RV205
E100
S200
T500
RV703
TP202
RV200
TP500
RV204
TP201
RV701
TP200
RV300
TP400
TP401
LV400
E500
TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

2. LTC Erasure Current Adjustment

Recording tape:

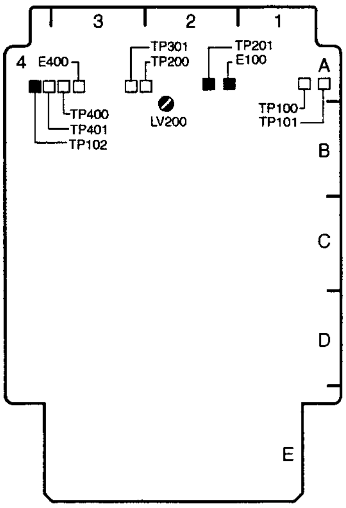
for HDW series:	BCT-HD series
for DVW series:	BCT-D series
for MSW series:	BCT-MX series

Note

Use the virgin tape or no recorded tape that erased using the tape eraser, etc. in advance.

Measuring equipment:
Audio level meter (V rms measurement mode)
Oscilloscope

1. Connect the audio level meter to TP201(A-2) on the TC-104 board. GND: E100/TC-104(A-2)
2. Insert the recording tape, then put into the recording mode.
3. Check the level on the audio level meter.
   Adj. point: ⊘LV200/TC-104(A-2)
   Specification: Maximum (110 mV rms or more: OK)
4. Disconnect the audio level meter and connect the oscilloscope to the same test point.
5. Check that the waveform appears with no distortion.
6. Eject the recording tape.



TC-104 Board (Side A)

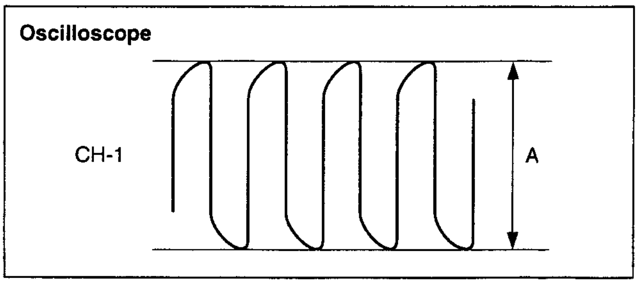
3. LTC PB Level Check

Alignment tape:

for HDW series:	HR5-1A
for DVW-2000/M2000:	ZR5-1
for DVW-2000P/M2000P:	ZR5-1P
for MSW series (NTSC model):	MR5-1
for MSW series (PAL model):	MR5-1P

Measuring equipment: Oscilloscope

1. Connect and set the oscilloscope as follows:
   CH-1: TP102/TC-104(A-4), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 μs/DIV
2. Insert the alignment tape.
3. Play back the alignment tape in following PB modes. And then check the level on the oscilloscope in each PB mode.
   PB modes: PLAY, REW,
   SHUTTLE (−5 times speed), and
   SHUTTLE (−0.21 time speed)
   Specification: A ≧ 1.5 V p-p (in each PB mode)



If any mode is not within specification, perform “6. Tape Path Alignment” again.

4. Eject the alignment tape.

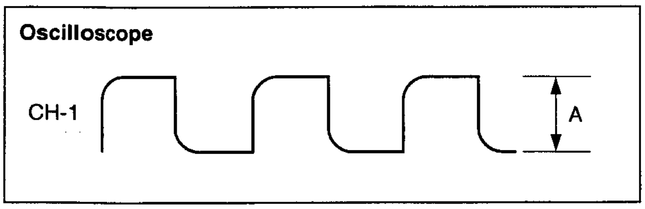
4. LTC 0A Check

Recording tape:

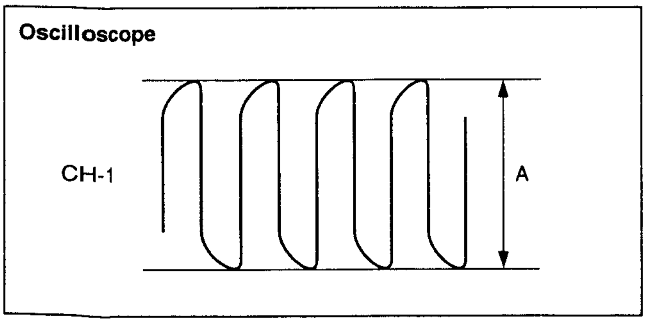
for HDW series:	BCT-HD series
for DVW series:	BCT-D series
for MSW series:	BCT-MX series

Measuring equipment: Oscilloscope
Time code generator and reader

1. Connect the output of the time code generator to TIME CODE IN connector.
2. Connect and set the oscilloscope as follows:
   CH-1: TP100/TC-104(A-1), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 µs/DIV
3. Insert the recording tape.
4. Check the level in recording mode.
   Specification: A = 50 ±5 mV p-p



5. Connect the input of the time code reader to TIME CODE OUT connector.
6. Change the connection of oscilloscope as follows:
   CH-1: TP102/TC-104(A-4)
   GND: E100/TC-104(A-2)
7. Play back the recorded portion at step 4 in PLAY mode. And then check that the time code can be read on the time code reader.
8. Check each level on the oscilloscope while playing back the recorded portion at step 4 in following PB modes.
   PB modes: PLAY, REW,
   SHUTTLE (−5 times speed), and
   SHUTTLE (−0.21 time speed)
   Specification: A ≧ 180 mV p-p (in each PB mode)



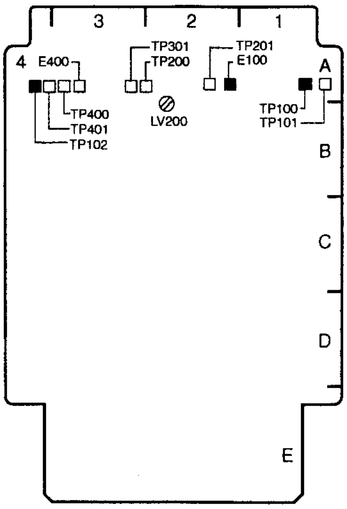
5. LTC Erase Ratio Check

Recording tape:

for HDW series:	BCT-HD series
for DVW series:	BCT-D series
for MSW series:	BCT-MX series

Measuring equipment:
Audio signal generator
Audio level meter (dB ratio measurement mode)
Band-pass filter (1 kHz)

1. Set the function menu Page1 as follows:
   F1 (TCG): EXT
   F2 (TCG): PRESET
2. Feed the audio signal (1 kHz, +7 dBu) from the audio signal generator to TIME CODE IN connector.
   (0 dBu ≒ 0.775 V rms)
3. Insert the recording tape, then record for 30 seconds.
   (Record the audio signal to the time code track.)
4. Disconnect the audio signal generator from TIME CODE IN connector.
5. Rewind the recorded portion by 15 seconds and insert the no signal to the time code track by 15 seconds.
6. Connect the audio level meter through a 1 kHz band-pass filter to TP102/TC-104(A-4).
   GND: E100/TC-104(A-2)
7. Play back the audio-signal-recorded portion in PLAY mode. And then measure the PB level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
8. Check the PB level on the audio analyzer while playing back the no-signal-recorded portion in PLAY mode.
   Specification: −40 dB or less
   (Regard a level of the audio-signal-recorded portion as 0 dB.)



TC-104 Board (Side A)

7-3-5. CUE PB System Adjustment (for HDW/DVW/MSW-M Series Only)

Alignment tape:
for HDW series: HR5-1A
for DVW-2000/M2000 and MSW-M2000/M2100:
ZR5-1
for DVW-2000P/M2000P and MSW-M2000P/M2100P:
ZR5-1P

Measuring equipment: Audio analyzer
Audio level meter

Preparation

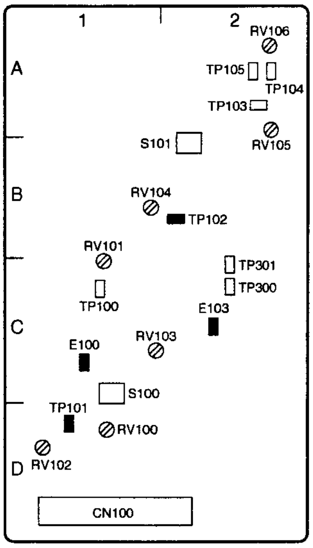
- Extend the CUE-13 board using the extension board EX-797.
- Open the AE-31 board.
  (See the figure of the Section 5-1-2.)
- **For HDW series only**
  Be sure to set the operation mode to 59.94 Hz with the setup menu ITEM-013.

1. CUE PB Frequency Response Adjustment

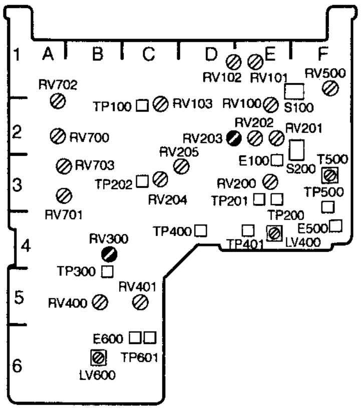
1. Connect the audio analyzer to the CUE OUT connector of the connector panel.
2. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
3. Play back the portion of 90 Hz to 12 kHz of the alignment tape.
4. Check the playback level through the audio analyzer.
   Adj. point: ●RV203/AE-31(D-2)
   Specification: Each frequency (3 kHz, 7 kHz, 10 kHz, 12 kHz) level: Level of 1 kHz ±0.8 dB
   Firstly, adjust the level of 10 kHz until it equates with the level of 1 kHz. And then check each level of other frequency.

2. CUE PB Level Adjustment

1. Using a shorting clip, make a short TP101/CUE-13(D-1) to E100/CUE-13(C-1).
2. Connect the audio level meter to TP102/CUE-13(B-2).
   GND: E103/CUE-13(C-2)
3. Play back the portion 1 kHz, +4 dBu of the alignment tape.
4. Check the level with the audio level meter, and then adjust it.
   Adj. point: ●RV300/AE-31(B-4)
   Specification: −10.0 ±0.2 dBu
5. Remove the shorting clip TP101/CUE-13(D-1) to E100/CUE-13(C-1).
6. Reset the operation mode to the original mode as necessary.


1
2
A
B
C
D
RV106
TP105
TP104
TP103
S101
RV105
RV104
TP102
RV101
TP301
TP300
TP100
E103
E100
RV103
S100
TP101
RV100
RV102
CN100

CUE-13 Board (Side A)


1
A
B
C
D
E
F
RV102
RV101
RV500
RV702
TP100
RV103
RV100
S100
RV202
RV201
2
RV700
RV203
RV205
E100
S200
T500
RV703
TP202
RV200
3
RV204
TP201
TP500
RV701
TP200
TP400
E500
RV300
TP401
LV400
4
TP300
RV401
5
RV400
E600
TP601
LV600
6

AE-31 Board (Side A)

7-3-6. CUE REC System Adjustment (for HDW/DVW Recorder Only)

Measuring equipment: Audio signal generator
Audio analyzer
Audio level meter
Oscilloscope
Frequency counter

Preparation

Open the AE-31 board. (See the figure of Section 5-1-2.)

1. CUE Erasure Current Adjustment

1. Connect the audio level meter to TP601/AE-31(C-6)
   GND: E600/AE-31(C-6)
2. Insert the recording tape and put into the recording mode.
   Recording tape: for HDW series: BCT-HD series
   Recording tape: for DVW series: BCT-D series
3. Check the level with the audio level meter, and then adjust it.
   Adj. point: ⊘LV600/AE-31(B-6)
   Specification: 160 ±5 mVrms

2. CUE Bias Frequency Adjustment

1. Connect the frequency counter to TP500/AE-31(F-3).
   GND: E500/AE-31(F-4)
2. Insert the tape for recording and put into the recording mode.
3. Check the frequency with the frequency counter, and then adjust it.
   Adj. point: ⊘T500/AE-31(F-3)
   Specification: 160 ±10 kHz

3. CUE Bias Trap Adjustment

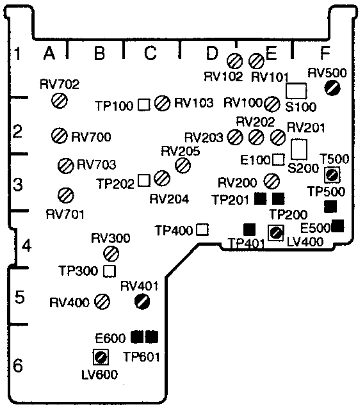
1. Ensure that the CUE INPUT connector of the connector panel is free; nothing is connected.
2. Connect the oscilloscope to TP401/AE-31(E-4).
   GND: E500/AE-31(F-4)
3. Insert the tape for recording and then put into the recording mode.
4. Check the level with the audio level meter, and then adjust it.
   Adj. point: ⊘LV400/AE-31(E-4)
   Specification: Minimize

4. CUE Bias Current Adjustment

1. Ensure that the CUE INPUT connector of the connector panel is free; nothing is connected.
2. Connect the audio level meter to TP200/AE-31(E-3)
   GND: TP201/AE-31(E-3)
3. Insert the tape for recording and then have the VTR in the recording mode.
4. Check the level with the audio level meter, and then adjust it.
   Adj. point: ⊘RV500/AE-31(F-1)
   Specification: 16 ±0.5 mVrms

5. CUE REC Frequency Response Adjustment

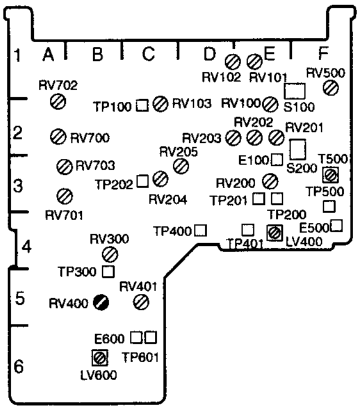
1. Connect the audio analyzer to the CUE OUT connector of the connector panel.
2. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input Filter: 80 kHz LPF
3. Insert the tape for recording.
4. Input −16 dBu audio signal to the CUE INPUT connector, and record each frequency as following:
   Recording audio signal: −16 dBu
   1 kHz, 3 kHz, 7 kHz, 10 kHz, and 12 kHz
5. Play back the recorded portion, and then check that the audio level for each frequency is within specifications through the audio analyzer.
   If the audio level is not within specification, adjust it in the REC mode while checking the level in the PB mode.
   Firstly, adjust the level of 10 kHz until it equates with the level of 1 kHz.
   And then check each level of other frequency.
   Adj. point (REC mode): ⊘RV401/AE-31(C-5)
   Specification (PB mode): Level of each frequency:
   Level of 1 kHz ±0.9 dB



AE-31 Board (Side A)

6. CUE REC Level Adjustment

1. Input the audio signal of 1 kHz +4 dBu to CUE INPUT connector of the connector panel.
2. Connect the audio analyzer to CUE OUT connector of the connector panel.
3. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input Filter: 80 kHz LPF
4. Insert the tape for recording, and then record and play back.
5. Check the PB level through the audio analyzer.
   If the audio level is not within the specification, adjust it in the REC mode till the level is within the specification.
   Adj. point (REC mode): ⊘RV400/AE-31(B-5)
   Specification (PB mode): +4.0 ±0.2 dBu


1
A
B
C
D
E
F
2
3
4
5
6
RV702
RV102
RV101
RV500
TP100
RV103
RV100
S100
RV202
RV201
RV700
RV203
RV205
E100
S200
T500
RV703
TP202
RV200
TP500
RV701
RV204
TP201
TP200
E500
RV300
TP400
TP401
LV400
TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

7-3-7. Time Code System Adjustment (for Player Only)

Note

Models to be adjusted:
HDW-M2100/M2100P
MSW-M2100/M2100P/M2100E/M2100EP

1. LTC Erasure Current Adjustment

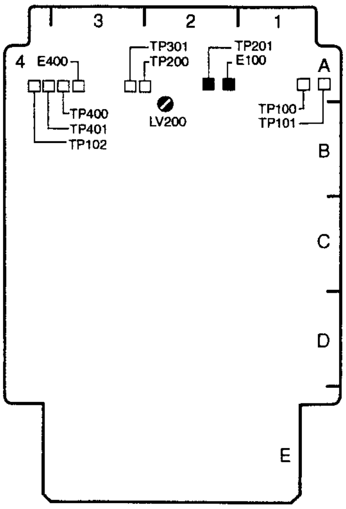
Recording tape: for HDW series: BCT-HD series
for MSW series: BCT-MX series

Note

Use a tape recorded with normal time codes on a different VTR with the same format.

Measuring equipment: Audio level meter

1. Connect the audio level meter to TP201/TC104 board(A-2). (Measuring mode on the effective value basis)
   GND: E100/TC-104(A-2)
2. Insert the recording tape.
3. Enter the maintenance mode.
4. Select A6 : LTC REC.
   Maintenance mode → M1 : ADJUST → A6 : LTC REC
5. Press F5 button (SET) once when "PUSH SET" is displayed on the video monitor screen.
   - It starts recording, and REC/ERASE Indicator lights on of GOOD SHOT.
6. Check the level of the audio level meter.
   Adj. point: ⊘LV200/TC-104(A-2)
   Specification: 120 mVrms (reference: 48.0 ±1.0 kHz)
7. Exit the maintenance mode.
8. Eject the recording tape.


3
2
1
4
E400
TP301
TP200
TP201
E100
A
TP400
TP401
TP102
LV200
TP100
TP101
B
C
D
E

TC-104 Board (Side A)

2. TC Insert Cross-talk Adjustment

Measuring equipment: Audio analyzer

1. Enter the maintenance mode.
2. Select A6 : LTC REC.
   Maintenance mode → M1 : ADJUST → A6 : LTC REC
3. Insert the Betacam SP cassette tape that recorded the no signal to the LAU tracks.
4. Set the audio analyzer as follows:
   Function mode: LEVEL
   Input filter: 80 kHz LPF

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Press the SET button twice in A6 : LTC REC state of the maintenance mode. (Starts TC insert mode.)
7. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
   Adj. points: ⊘RV700/AE-31(A-2)
   ⊘RV702/AE-31(A-2)
   Specification: Minimize
   (The level should be less than −18 dBu)
8. Press the EXIT button. (The tape stops.)

CH2 adjustment

9. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
10. Press the SET button twice in A6 : LTC REC state of the maintenance mode. (Starts TC insert mode.)
11. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
    Adj. points: ⊘RV701/AE-31(A-3)
    ⊘RV703/AE-31(A-3)
    Specification: Minimize
    (The level should be less than −18 dBu)
12. Press the EXIT button, then eject the cassette tape.
13. Exit the maintenance mode.

3. LTC PB Level Check

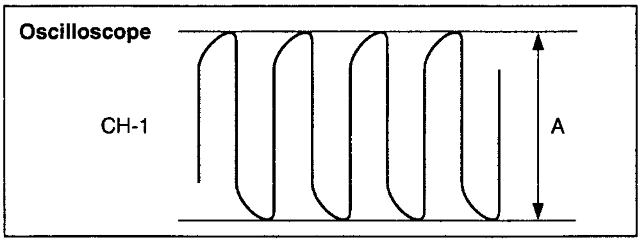
Alignment tape:

for HDW-M2100/M2100P:	HR5-1A
for MSW-M2100:	MR5-1
for MSW-M2100P:	MR5-1P

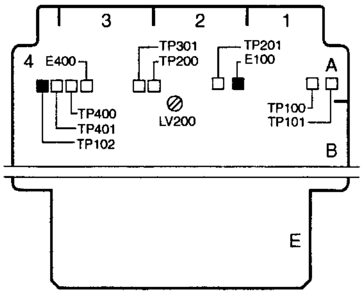
Measuring equipment: Oscilloscope

1. Connect and set the oscilloscope as follows:
   CH-1: TP102/TC-104(A-4), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 μs/DIV
2. Insert the alignment tape.
3. Play back the alignment tape in the following mode. Then, check level of the wave form in the oscilloscope.
   PB mode: PLAY, REW, SHUTTLE (−5 times speed), and
   SHUTTLE (−0.21 times speed)
   Specification: A ≧ 1.5 V p-p

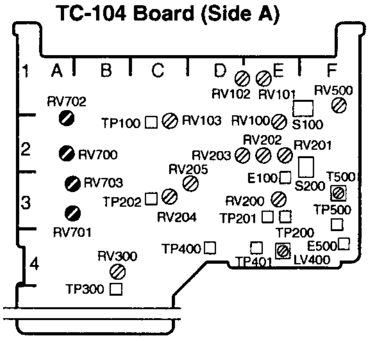
If any mode is not within specification, perform " 6. Tape Path Alignment" again.


Oscilloscope
CH-1
A

4. Eject the alignment tape.


3
2
1
4
A
B
E
E400
TP301
TP200
TP201
E100
TP400
TP401
TP102
LV200
TP100
TP101

TC-104 Board (Side A)


1
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3
4
A
B
C
D
E
F
RV102
RV101
RV500
RV702
TP100
RV103
RV100
S100
RV202
RV201
RV700
RV203
RV205
E100
T500
S200
RV703
TP202
RV200
TP500
RV204
TP201
RV701
TP200
RV300
TP400
E500
TP401
LV400
TP300

AE-31 Board (Side A)

Section 8
Electrical Alignment

8-1. Electrical Alignment Overview

8-1-1. Precautions

- Some items in this section require to perform adjustment in both the standard mode and the alternative mode. Switch the mode and adjust as directed.
- Be sure to adjust each block in order unless any instructions are provided.
- Do not contact with adjusting part when other than required.
- Do not execute automatic adjustment, and do not change adjustment data when other than required.
  In case either of these is done unintentionally, do not save the data. To recover it, turn off the power of the VTR or execute "ALL DATA PREVIOUS" in each NV-RAM control menu so as not to save the data.

  Note

  As for the servo and DT systems, the function of "ALL DATA PREVIOUS" is not included in the NV-RAM control menu.
  In case the automatic adjustment is executed unintentionally, be sure to turn off the power of the VTR.
- For details on the maintenance mode, refer to Section 3.
- Before beginning adjustment, it is recommended to make a copy of setup conditions. If customer conditions are noted, the settings can be returned easily to its customer condition after finishing adjustment.
  Settings of switches on panels, circuit boards, and function menu:
    Use the setting check sheets. (Refer to the installation manual.)
  Settings of the setup menu:
    Use a Memory Stick or memory card. (Refer to "1-27. Memory Stick (or Memory Card)".)

8-1-2. Outline of Electrical Alignment

In Section 8 explains the all electrical adjustment to each block.

Block	Reference	Contents	Object of adjustment
Power supply unit	Section 8-2	Output voltage check of power supply unit	———
Servo/DT	Section 8-3	Servo system and DT system alignment	DT-47, DR-414/508, SS-89
RF	Section 8-4	RF system alignment	EQ-84
Audio	Section 8-5	Adjustment of Analog audio input/output line Adjustment of Analog Betacam LAU/AFM PB line Adjustment of CUE line	APR-52, AE-31, AU-272, CUE-13
Video	Section 8-6	Adjustments of Video reference signal, Video process, and Analog video output Adjustments of Analog composite Video input line Adjustment of Analog component Video input line	VPR-64/91
Analog Betacam video	Section 8-7	Analog Betacam video PB system alignment	DM-123, EQ-84
SDI/SDTI	Section 8-8	Free-running VCO adjustment of Encoder/Decoder for SDI and SDTI interface	SDI-52, DIF-109 (DIF-134)
HD Video	Section 8-9	Digital Video system adjustment (HDW series only)	HIF-1
Full erase, Time code	Section 8-10	LTC system adjustment/check and Full erasure current check	TC-104
Tele-File	Section 8-11	Tele-File system adjustment	DIO-65

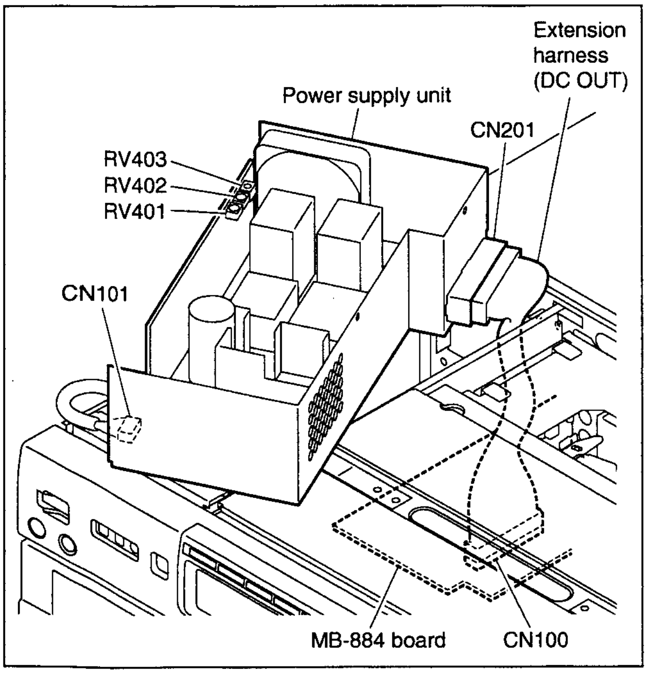
8-2. Power Supply Output Voltage Check

Tools

- Digital voltmeter: Advantest TR6845 or equivalent
- Extension harness (DC OUT) (Part No. 1-960-985-11)

Preparation

1. Turn off the power.
2. Disconnect the power cord.
3. Lay the power supply unit on the machine as shown in the figure. Connect the harness from POWER switch to the CN101 of the power supply unit.
4. Connect the extension harness (DC OUT) between CN100 on the MB-884 board and CN201 of the power supply unit.

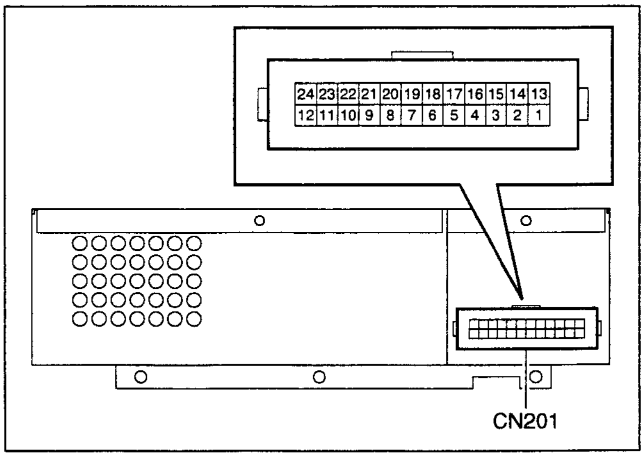

Extension harness (DC OUT)
Power supply unit
CN201
RV403
RV402
RV401
CN101
MB-884 board
CN100

5. Reconnect the power cord.
6. Wait for 10 minutes after turning on the power.

Voltage Check

Check each output voltage of power supply lines at the terminal contact of the extension harness.

CN201 Pin No.	Wire color	Output voltage (Signal name)	Specification
1	Blue	−15 V	−15.0 ±1.0 V
2, 14	White	+21 V	+21.0 ±2.0 V
3, 15	Orange	+6.2 V	+6.2 ±0.6 V
4, 5, 16, 17	Red	+3.4 V	+3.4 ±0.3 V
6	Gray	+15 V	+15.0 ±1.0 V
7, 18, 19	Brown	+2.5 V	+2.5 ±0.2 V
8, 9, 10 20, 21, 22, 23	Black	GND	
11	Yellow	Low Volt. S	———
12	Yellow	FAN S	———
13	Violet	−6.2 V	−6.2 ±0.6 V
24	Yellow	+12 V	+12.0 ±1.0 V


24 23 22 21 20 19 18 17 16 15 14 13
12 11 10 9 8 7 6 5 4 3 2 1
CN201

Power Supply Unit (MAIN2 Board)

If the specification is not satisfied

Replace the power supply unit or make sure that repair of this unit had been completed.

8-3. Servo/DT Systems Alignment

8-3-1. Adjustment Overview

In the following case, listed below, be sure to carry out the servo/DT systems alignment (Section 8-3-2 through Section 8-3-6):

- When the DR-414/508 board is replaced
- When the NV-RAM (IC101/DR-414 or DR-508 board) is replaced

All the adjustments of the servo and DT systems are adjusted using the menus in the maintenance mode.

Notes

- For HDW series and MSW series: The servo/DT system alignment and data saving should be performed in either the standard mode or the alternative mode. When the adjustment is completed in either mode, adjustment in the other mode is not required.
  (DVW series has the standard mode only.)
- For detail of each menu in the maintenance mode, refer to Section 3.
  The countermeasures against the malfunction of an automatic adjustment (an error message "ADJUST INCOMPLETE" will be displayed on the video monitor) also are described in Section 3.

Tools

The following equipment (or equivalent) and fixtures are required:

Tools	Type	Part No.	HDW-			DVW-		MSW-		
			2000 D2000	M2000/P S2000/P	M2100/P	2000	M2000	2000	A2000/P M2000/P M2000E/P	M2100 M2100E/P
Oscilloscope	Tektronix TDS460A		O	O	–	O	O	O	O	-
Analog composite video monitor[*1]			O	O	O	O	O	O	O	O
Extension board	EX-739	A-8324-911-A	O	O	–	O	O	O	O	-
Alignment tapes	HR2-1A	8-960-076-11	O	O	–	–	–	–	–	-
	HR5-1A	8-960-076-01	O	O	O	–	–	–	–	-
	ZR2-1	8-960-073-11	–	–	–	N	N	–	–	-
	ZR2-1P	8-960-073-61	–	–	–	P	P	–	–	-
	ZR5-1	8-960-073-01	–	–	–	N	N	–	–	-
	ZR5-1P	8-960-073-51	–	–	–	P	P	–	–	-
	MR2-1P	8-960-077-61	–	–	–	–	–	O	O	-
	MR5-1	8-960-077-01	–	–	–	–	–	N	N	N
	MR5-1P	8-960-077-51	–	–	–	–	–	P	P	P
	CR5-1B	8-960-096-41	–	N	N	–	N	–	N	N
	CR5-1B PS	8-960-096-91	–	P	P	–	P	–	P	P
Recording tapes	Sony BCT-HD		O	O	–	–	–	–	–	-
	Sony BCT-D		–	–	–	O	O	–	–	-
	Sony BCT-MX		–	–	–	–	–	O	O	-

O: Required N: Required for NTSC model P: Required for PAL model –: Not required

*1: This monitor is for menu displaying.
Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Adjustments

Note

The adjustment of Section 8-3-6 is not necessary for HDW-2000/D2000, DVW-2000/P and MSW-2000 with no function of analog Betacam playback.

Section	Item (Section title)	Adjustment point	Remarks
8-3-2	Servo continuity automatic adjustment	A000 : A001-A00A ADJ.	S reel FG duty adjustment (A001) T reel FG duty adjustment (A002) Capstan FG duty adjustment (A003) S reel offset/friction adjustment (A004) T reel offset/friction adjustment (A005) S reel torque adjustment (A006) T reel torque adjustment (A007) Capstan QPL gain Adjustment (A008) T reel QPL gain Adjustment (A009) S/T reel tension offset adjustment (A00A)
	Data saving	A00F : NV-RAM CONTROL	
8-3-3	RF switching position adjustment	A00B : RF SWITCHING POS.	
	Data saving	A00F : NV-RAM CONTROL	
8-3-4	SAT signal level check		For recorder only
8-3-5	Digital DT system adjustment	A011 : DIGITAL DT ADJUST	
	Data saving	A01F : NV-RAM CONTROL	
8-3-6	Analog DT system adjustment	A010 : ANALOG DT ADJUST	Exclude HDW-2000/D2000, DVW-2000/P and MSW-2000
	Data saving	A01F : NV-RAM CONTROL	

8-3-2. Servo Continuity Automatic Adjustment

Note

Automatic adjustment does not use any alignment tape.

1. Enter the maintenance mode.
2. Enter A000 : A001-A00A ADJ..
   Maintenance mode → M1 : ADJUST → A0 : SERVO/DT → A00 : SERVO ADJUST → A000 : A001-A00A ADJ.
3. To execute this adjustment, press the F5 (SET) button once.
   - The execution time is about 200 seconds.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
4. To exit A000 : A001-A00A ADJ., press the F6 (EXIT) button once.

Saving the Data

5. Enter A00F : NV-RAM CONTROL, then execute "SAVE SERVO ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

6. Exit the maintenance mode.

8-3-3. RF Switching Position Adjustment

Alignment tape:	
for HDW Recorder:	HR2-1A
for HDW Player:	HR5-1A
for DVW-2000/M2000:	ZR2-1
for DVW-2000/P, M2000/P:	ZR2-1P
for MSW Recorder:	MR2-1P
for MSW-M2100/M2100E:	MR5-1
for MSW-M2100P/M2100EP:	MR5-1P

1. Insert the alignment tape, then rewind it to the tape beginning.
2. Enter the maintenance mode.
3. Enter A00 : SERVO ADJUST.
   Maintenance mode → M1 : ADJUST → A0 : SERVO/DT → A00 : SERVO ADJUST
   - The alignment tape is ejected.
4. Enter A00B : RF SWITCHING POS.
5. Select "AUTO" and press the F5 (SET) button once.
6. Insert the alignment tape again.
   - Adjustment is executed automatically when the alignment tape is inserted.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A00B : RF SWITCHING POS, press the F6 (EXIT) button once.

Saving the Data

8. Enter A00F : NV-RAM CONTROL, then execute "SAVE SERVO ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.
10. Eject the alignment tape.

8-3-4. SAT Signal Level Check (for Recorder Only)

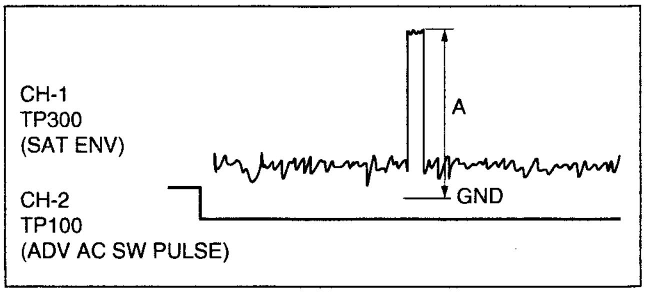
Notes

- For HDW series and MSW series:
  This check is required in both the standard mode and the alternative mode.
  NTSC model:
  Standard mode: 59.94 Hz or 525
  Alternative mode: 50 Hz or 625
  PAL model:
  Standard mode: 50 Hz or 625
  Alternative mode: 59.94 Hz or 525
- When 24Psf recording is available in the HDW series, this check is required separately in the 24 Hz mode.

Tools

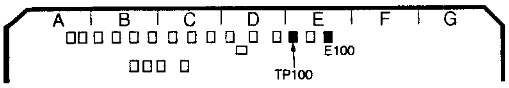
- Oscilloscope
- Extension board EX-739
- Recording tape: for HDW series: BCT-HD
  for DVW series: BCT-D
  for MSW series: BCT-MX

1. Turn the power off.
2. Extend the SS-89 board with an extension board EX-739.
3. Turn the power on.
4. Connect and set the oscilloscope as follows:
   CH-1: TP300/SS-89(H-1), DC 500 mV/DIV
   GND: E2300/SS-89(H-4)
   CH-2: TP100/EQ-84(D-1 or E-1), DC 2 V/DIV
   GND: E100/EQ-84(E-1)
   TIME: 500 μs/DIV
   TRIG: CH-2, − slope
5. Insert the recording tape, and then carry out recording for about 30 seconds.
6. Play back the recorded portion. After the servo locks in, check the waveform of CH-1 in the low level period of CH-2.
   Specification: $1.0 \leqq A \leqq 2.5$ V
   When the specification is not satisfied, carry out "7-2-3. Drum Phase Adjustment", and then perform this check again.

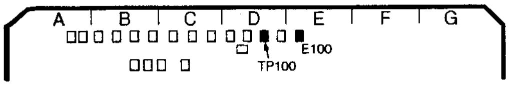


7. For HDW/MSW series
   Switch the operation mode to the alternative mode with the setup menu ITEM-013, and then perform steps 5 and 6 again.
8. For HDW series
   When 24Psf recording is available, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and repeat steps 5 and 6.
9. For HDW/MSW series
   Reset the operation mode to the standard mode with the setup menu ITEM-013.

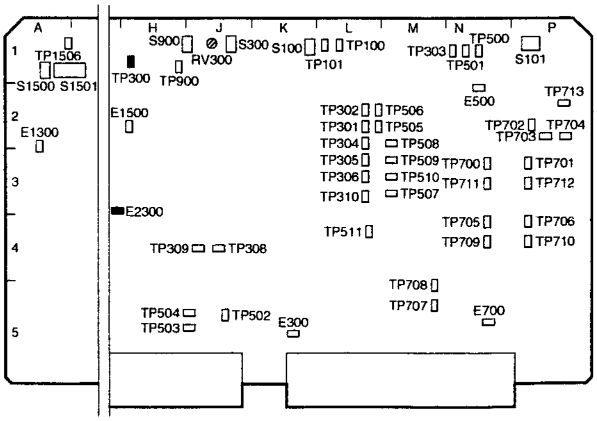
Board No.suffix -12


A
B
C
D
E
F
G
E100
TP100

Board No.suffix -13 and higher


A
B
C
D
E
F
G
E100
TP100

EQ- Board (Side A)


A
H
J
K
L
M
N
P
1
2
3
4
5
TP1506
S1500
S1501
E1300
S900
S300
S100
TP100
TP303
TP500
S101
RV300
TP101
TP501
TP300
TP900
E500
TP713
E1500
TP302
TP506
TP301
TP505
TP702
TP704
TP703
TP304
TP508
TP305
TP509
TP700
TP701
TP306
TP510
TP711
TP712
TP310
TP507
E2300
TP511
TP705
TP706
TP309
TP308
TP709
TP710
TP708
TP707
TP504
TP502
E700
TP503
E300

SS-89 Board (Side A)

8-3-5. Digital DT System Adjustment

Note

Perform this adjustment in the standard mode.

Alignment tape:

for HDW series:	HR5-1A
for DVW-2000/M2000:	ZR5-1
for DVW-2000P/M2000P:	ZR5-1P
for MSW series (NTSC):	MR5-1
for MSW series (PAL):	MR5-1P

1. Insert the alignment tape, then cue up it to the time code 00:10:00:00.
2. Enter the maintenance mode.
3. Enter A01 : DT ADJUST.
   Maintenance mode → M1 : ADJUST → A0 : SERVO/DT → A01 : DT ADJUST
4. Enter A011 : DIGITAL DT ADJUST.
5. Message "Auto Adjust (Push SET)" is displayed on the video monitor, then press F5 (SET) button.
   - The alignment tape is ejected.
6. Message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape again.
   - Adjustment is executed automatically when the alignment tape is inserted.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A011 : DIGITAL DT ADJUST, press the F6 (EXIT) button once.

Saving the Data

8. Enter A01F : NV-RAM CONTROL, then execute "SAVE DT DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.

8-3-6. Analog DT System Adjustment

Notes

- This adjustment is not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.
- Perform this adjustment in the standard mode.

Alignment tape:

for NTSC model:	CR5-1B
for PAL model:	CR5-1B PS

1. Insert the alignment tape, then cue up it to the time code 00:14:00:00.
2. Enter the maintenance mode.
3. Enter A01 : DT ADJUST.
   Maintenance mode → M1 : ADJUST → A0 : SERVO/DT → A01 : DT ADJUST
4. Enter A010 : ANALOG DT ADJUST.
5. Message "Auto Adjust (Push SET)" is displayed on the video monitor, then press F5 (SET) button.
   - The alignment tape is ejected.
6. Message "SET ALIGNMENT TAPE" is displayed, then insert the alignment tape again.
   - Adjustment is executed automatically when the alignment tape is inserted.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this automatic adjustment is completed normally.
7. To exit A010 : ANALOG DT ADJUST, press the F6 (EXIT) button once.

Saving the Data

8. Enter A01F : NV-RAM CONTROL, then execute "SAVE DT DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

9. Exit the maintenance mode.

8-4. RF System Alignment/EQ-84 Board

8-4-1. Adjustment Overview

For the RF system alignment, perform adjustments for all formats that allow recording and playback.
Perform adjustments using the menu of the maintenance mode.
Adjustments are required for the following in the RF system.

Record system of the digital format (For recorder only)
Playback system of the digital format
Playback system of the analog Betacam format (For models having analog Betacam playback function only)

Note

Adjustment items for each record/playback format are shown in the table below:

Adjustment step	HDW-														
	2000			**D2000**			**M2000** **M2000P**			**S2000** **S2000P**			**M2100** **M2100P**		
8-4-2. Digital Format															
1. Cleaning	○			○			○			○			○		
2. Function menu	○			○			○			○			○		
3. Setting to Standard Mode	○			○			○			○			○		
1. HDCAM Format															
PB system adj.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
REC current adj.	○	○	○	○	○	○	○	○	○	○	○	○	–	–	
Switching to Alternative Mode	○	–		–	–		–	–		–	–		–	–	
Switching to 24 Hz Mode*		○		–	–		–	–		–	–		–	–	
2. Digital Betacam Format															
PB system adj.	–			○	○		○	○		–	–		○	○	
REC current adj.	–			–	–		–	–		–	–		–	–	
3-A. MPEG IMX Format															
PB system adj.	–			○	○		○	○		–	–		○	○	
REC current adj.	–			–	–		–	–		–	–		–	–	
Switching to Alternative Mode				○											
Switching to 24 Hz Mode*					○										
3-B. MPEG IMX Format ×2 Speed															
PB system adj.	–						–	–		–	–		–	–	
4. Betacam SX Format															
PB system adj.	–						○	○		○	○		○	○	
Switching to Alternative Mode	–						–	–		–	–		–	–	
8-4-3. Betacam/Betacam SP Format															
1. Initial Data Setting (in Standard Mode)	–						○	–		○	–		○	–	
2. PB system adj.	–						○	○		○	○		○	○	
⋮ ⋮							⋮	⋮		⋮	⋮		⋮	⋮	
7. Switching to Alternative Mode	–						○	–		○	–		○	–	
8. Initial Data Setting (in Alternative Mode)	–						○	–		○	–		○	–	
Switching to 24 Hz Mode*	–							○			○			○	

*: For 24 Hz mode supporting models only

DVW-		MSW-								
2000 2000P	M2000 M2000P	2000		A2000 A2000P		M2000 M2000P M2000E M2000EP		M2100 M2100P M2100E M2100EP		**Adjustment step**
										8-4-2. Digital Format
○	○	○		○		○		○		1. Cleaning
○	○	○		○		○		○		2. Function menu
○	○	○		○		○		○		3. Setting to Standard Mode
										1. HDCAM Format
										PB system adj.
										REC current adj.
										Switching to Alternative Mode
										Switching to 24 Hz Mode*
										2. Digital Betacam Format
○	○					○	○	○	○	PB system adj.
○	○					–	–	–	–	REC current adj.
										3-A. MPEG IMX Format
	○	○	○	○	○	○	○	○	○	PB system adj.
	–	○	○	○	○	○	○	–	–	REC current adj.
										Switching to Alternative Mode
										Switching to 24 Hz Mode*
										3-B. MPEG IMX Format ×2 Speed
	–	–	–	○	○	○	○	○	○	PB system adj.
										4. Betacam SX Format
	○	○	○	○	○	○	○	○	○	PB system adj.
	–	○		–	–	–	–	–	–	Switching to Alternative Mode
										8-4-3. Betacam/Betacam SP Format
	○	–		○	–	○	–	○	–	1. Initial Data Setting (in Standard Mode)
	○	–		○	○	○	○	○	○	2. PB system adj.
	⋮			⋮	⋮	⋮	⋮	⋮	⋮	
		–		○		○		○		7. Switching to Alternative Mode
		–		○		○		○		8. Initial Data Setting (in Alternative Mode)
										Switching to 24 Hz Mode*

∗ : For 24 Hz mode supporting models only

Notes

- The RF system adjustment is required in both the standard mode and the alternative mode.
  Adjust in the standard mode, and then adjust in the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 625
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

- When 24Psf recording is available in the HDW series, the RF system adjustment is also required in the 24Hz mode.
- For detail of each menu in the maintenance mode, refer to Section 3.
  The countermeasures against the malfunction of an automatic adjustment (an error message "Auto Adjust Failure" or "Condition NG" will be displayed on the video monitor) had been described there.

Tools

The following equipment (or equivalent) and fixtures are required:

Tools Type	HDW-					DVW-		MSW-			
	2000	D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P M2000E M2000EP	M2100 2100P M2100E M2100EP
Oscilloscope Tektronix TDS460A	–	–	○	○	○	–	○	–	○	○	○
Analog composite video monitor *1	○	○	○	○	○	○	○	○	○	○	○
Extension board EX-739	–	–	○	○	○	–	○	–	○	○	○
Cleaning cloth	○	○	○	○	○	○	○	○	○	○	○
Cleaning fluid	○	○	○	○	○	○	○	○	○	○	○
Cleaning tape Sony BCT-HD12CL	○	○	○	○	–	○	○	○	○	○	–
Alignment tapes HR5-1A	○	○	○	○	○	–	–	–	–	–	–
ZR5-1	–	○	○	–	○	N	N	–	–	○	○
ZR5-1P	–	○	○	–	○	P	P	–	–	○	○
MR5-1	–	○	○	–	○	–	N	○	○	○	○
MR5-1P	–	○	○	–	–	–	P	○	○	○	○
SR5-1	–	–	○	○	○	–	N	○	○	○	○
SR5-1P	–	–	○	○	○	–	P	○	○	○	○
CR5-1B	–	–	○	○	○	–	N	–	○	○	○
CR5-1B PS	–	–	○	○	○	–	P	–	○	○	○
CR5-2A	–	–	○	○	○	–	N	–	○	○	○
CR5-2A PS	–	–	○	○	○	–	P	–	○	○	○
Recording tapes *2 Sony BCT-HD	○	○	○	○	–	–	–	–	–	–	–
Sony BCT-D	–	–	–	–	–	○	○	–	–	–	–
Sony BCT-MX	–	–	–	–	–	–	–	○	○	○	–

○: Required N: Required for NTSC model P: Required for PAL model –: Not required

*1: This monitor is for menu displaying.
Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
*2: Use the blank tape erased using a tape eraser in advance or a new blank tape as a recording tape for the RF system alignment.

Adjustments

Notes

- Section 8-4-2. MPEG IMX RF Adjustment: Follow with the menus for the digital format. It is applied to the digital VTR having PB function.
- The adjustment of Section 8-4-3 is not necessary for HDW-2000/D2000, DVW-2000/P and MSW-2000 with no function of analog Betacam playback.

Section	Item (Section title)	Adjustment point	Remarks (Measurement point)
8-4-2	Itemized Digital Format RF System adjustments		
	HDCAM	A137 : A131-A136 ALL ADJUST	For HDW series only
	Data saving	A1F : NV-RAM CONTROL	
	Digital Betacam	A127 : A121-A126 ALL ADJUST	For HDW-D/M, DVW, MSW-M series only
	Data saving	A1F : NV-RAM CONTROL	
	MPEG IMX	A117 : A111-A116 ALL ADJUST	For HDW-D/M, DVW, MSW series only
	Data saving	A1F : NV-RAM CONTROL	
	MPEG IMX ×2	A147 : A141-A146 ALL ADJUST	For MSW-A/MSW-M series only
	Data saving	A1F : NV-RAM CONTROL	
	Betacam SX	A107 : A101-A106 ALL ADJUST	For HDW-M/HDW-S/DVW-M/ MSW series only
	Data saving	A1F : NV-RAM CONTROL	
8-4-3	Betacam / Betacam SP format PB system (EQ RF output level) adjustment		For HDW-M/HDW-S/DVW-M/ MSW-A/MSW-M series only
	METAL Y	A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-A, B	(TP101/DM-123)
	METAL C	A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-A, B	(TP301/DM-123)
	OXIDE C	A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-C-A, B	(TP301/DM-123)
	OXIDE Y	A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-Y-A, B	(TP101/DM-123)
	Data saving	A3F : NV-RAM CONTROL	

When wish to single out adjusting only for recording current of the VTR, refer to Section "8-4-4. Recording Current Adjustment".
Select and execute relative menus for formats which enable recording.

Section	Item (Section title)	Adjustment point	Remarks
8-4-4	Recording current adjustment		
	HDCAM	A132 : REC CURRENT	For HDW recorder only
	Data saving	A1F : NV-RAM CONTROL	
	Digital Betacam	A122 : REC CURRENT	For DVW recorder only
	Data saving	A1F : NV-RAM CONTROL	
	MPEG IMX	A112 : REC CURRENT	For MSW recorder only
	Data saving	A1F : NV-RAM CONTROL	

8-4-2. Itemized Digital Format RF System Adjustments

Preparation

1. Clean the video heads.

(Refer to "4-2-3. Tape Running Surface of Upper Drum and Video Heads Cleaning".)

Note

Be sure to turn off the power while cleaning.

2. Check the settings of the function menu.

Note

The R marked setting is for recorder only.

Item	Customer setting	Setting at adjustment
Page4	F4 (CHARA)	⇨ ON
	R F5 (REC INH)	⇨ OFF

3. Warming up

Before starting the adjustment, warm up the VTR through the power for 20 minutes or more.

4. Check the operation mode is set to the standard mode as below:

- NTSC model: 59.94 Hz or 525 mode
- PAL model: 50 Hz or 625 mode

Precautions on the automatic adjustment

- Be careful not to touch the search dial and buttons which have an effect on tape running during the automatic adjustment. If tape running condition is changed, optimum adjustment can not be performed. Besides the automatic adjustment operation may freeze, or the result of automatic adjustment become "FAIL" or "NG".
- If the adjustment with the automatic adjustment does not complete properly (i.e. an error message "Auto Adjust Failure" or "Condition NG" is displayed on the video monitor), refer to "For Condition NG / Automatic Adjustment Failure" in Section 3-3-3.

1. HDCAM Format

Model to be adjusted: HDW series

Tools

- Alignment tape: HR5-1A
- Recording tape: Sony BCT-HD (for HDW recorder only)

PB system adjustment

1. Insert the alignment tape, then cue up it to the time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A137 : A131-A136 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF → A13 : HD RF ADJUST → A137 : A131-A136 ALL ADJUST
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. To execute the automatic adjustments for PB system, press the F5 (SET) button once.
   - After five or six minutes, the PB system adjustments are completed.

Recording current adjustment (recorder only)

5. After the message "Set a blank tape and push SET button for REC CURRENT adjustment" is displayed on the video monitor, eject the alignment tape, and then insert the HDCAM recording tape.
6. To execute the automatic adjustment for the recording current, press the F5 (SET) button.

End of adjustment

7. After the message "Auto Adjust Complete" is displayed on the video monitor, press the F6 (EXIT) button to exit A137 : A131-A136 ALL ADJUST.

Saving the Data

Note

Do not save the adjustment data if any automatic adjustment was not completed properly.

8. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.
10. Eject the cassette tape.
11. **HDW-2000:**
    Switch the operation mode to the alternative mode with the setup menu ITEM-013, and then carry out again "1. HDCAM Format".
    After completing adjustments in the alternative mode, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and then carry out again "1. HDCAM Format".
    Then switch the operation mode to the standard mode.
    The RF system adjustment is now completed.
    HDW-D2000, M2000/P, M2100/P:
    Go to "2. Digital Betacam Format".
    HDW-S2000/P:
    Go to "4. Betacam SX Format".

2. Digital Betacam Format

Models to be adjusted: HDW-D/M series
DVW series
MSW-M series

Tools

- Alignment tape: for 59.94 Hz or 525 mode: ZR5-1
  for 50 Hz or 625 mode: ZR5-1P
- Recording tape: Sony BCT-D (for DVW series only)

PB system adjustment

1. Insert the alignment tape, then cue up it to the time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A127 : A121-A126 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF → A12 : DB RF ADJUST → A127 : A121-A126 ALL ADJUST
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. To execute the automatic adjustments, press the F5 (SET) button once.
   The adjustment will be completed after 5 to 6 minutes.

Recording current adjustment (DVW series only)

5. After the message "Set a blank tape and push SET button for REC CURRENT adjustment" is displayed on the video monitor, eject the alignment tape, and then insert the Digital Betacam recording tape.
6. To execute the automatic adjustment for the recording current, press the F5 (SET) button.

End of adjustment

7. After the message "Auto Adjut Complete" is displayed on the video monitor, press the F6 (EXIT) button once to exit A127: A121-A126 ALL ADJUST.

Saving the Data

Note

Do not save the adjustment data if the automatic adjustment was not completed properly.

8. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.
10. Eject the alignment tape.
11. **HDW-D2000, M2000/P, M2100/P:**
    MSW-M2000/P, M2000E/P, M2100/P, M2100E/P:
    Go to "3-A. MPEG IMXFormat".
    DVW-2000/P:
    The RF system adjustment is now completed.

3-A. MPEG IMX Format

Models to be adjusted: HDW-D/M series
DVW-M series
MSW series

Tools

- Alignment tape: for 59.94 Hz or 525 mode: MR5-1
  for 50 Hz or 625 mode: MR5-1P
- Recording tape: Sony BCT-MX
  (for MSW recorder only)

PB system adjustment

1. Insert the alignment tape, then cue up it to the time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A117 : A111-A116 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF → A11 : IMX RF ADJUST → A117 : A111-A116 ALL ADJUST
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. To execute the automatic adjustments for PB system, press the F5 (SET) button once.
   - After five or six minutes, the PB system adjustments are completed.

Recording current adjustment (MSW recorder only)

5. After the message "Set a blank tape and push SET button for REC CURRENT adjustment" is displayed on the video monitor, eject the alignment tape, and then insert the MPEG IMX recording tape.
6. To execute the automatic adjustment for the recording current, press the F5 (SET) button.
7. After the message "Auto Adjust Complete" is displayed on the video monitor, press the F6 (EXIT) button once to exit A117 : A111-A116 ALL ADJUST.

Saving the Data

Note

Do not save the adjustment data if any automatic adjustment was not completed properly.

8. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to the previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.
10. Eject the cassette tape.
11. **HDW-M2000/P, M2100/P:**
    DVW-M2000/P:
    MSW-2000:
    Go to "4. Betacam SX Format".
    MSW-A2000/P, M2000/P, M2000E/P, M2100/P, M2100E/P:
    Go to "3-B. MPEG IMX Format Two Times Speed".
    HDW-D2000:
    Switch the operation mode to the alternative mode with the setup menu ITEM-013, and then carry out again "1. HDCAM Format".
    After completing adjustments in the alternative mode, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and then carry out again "1. HDCAM Format".
    Then switch the operation mode to the standard mode.
    The RF system adjustment is now completed.

3-B. MPEG IMX Format Two Times Speed

Models to be adjusted: MSW-A series
MSW-M series

Tools

- Alignment tape: for 525 mode: MR5-1
  for 625 mode: MR5-1P

PB system adjustment

1. Insert the following alignment tape, then cue up it to the time code 00:03:00:00.
2. Activate the maintenance mode.
3. Enter A147 : A141-A146 ALL ADJUST.
   Maintenance Mode → M1 : ADJUST → A1 : RF → A14 : ×2 RF ADJUST → A147 : A141-A146 ALL ADJUST
   "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Press F5 (SET) button to start the automatic adjustment.
   The automatic adjustment will be completed after around 30 seconds, and "Auto Adjust Complete" will be displayed on the monitor.
5. Press F6 (EXIT) button once to exit A147 : A141-A146 ALL ADJUST.

Saving the Data

Note

Do not save the adjustment data if any automatic adjustment was not completed properly.

6. Enter "A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
7. Exit the maintenance mode.
8. Eject the alignment tape.
9. Go to "4. Betacam SX Format."

4. Betacam SX Format

Models to be adjusted: HDW-M/S series
DVW-M series
MSW series

Tools

• Alignment tape:	for 59.94 Hz or 525 mode:	SR5-1
	for 50 Hz or 625 mode:	SR5-1P

PB system adjustment

1. Insert the alignment tape, then cue up it to the time code 00:03:00:00.
2. Enter the maintenance mode.
3. Enter A107 : A101-A106 ALL ADJUST.
   Maintenance mode → M1 : ADJUST → A1 : RF → A10 : SX RF ADJUST → A107 : A101-A106 ALL ADJUST
   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. To execute the automatic adjustments, press the F5 (SET) button once.
   The adjustment will be completed after 5 to 6 minutes. Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
5. To exit A107 : A101-A106 ALL ADJUST, press the F6 (EXIT) button once.

Saving the Data

Note

Do not save the adjustment data if the automatic adjustment was not completed properly.

6. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

7. Exit the maintenance mode.
8. Eject the alignment tape.
9. **MSW-2000:**
   Switch the operation mode to the alternative mode with the setup menu ITEM-013, and then go to "3-A. MPEG IMX Format" again.
   After completing "3-A" and "4" adjustments in the alternative mode, switch the operation mode to the standard mode. The RF system adjustment is now completed.
   HDW-M2000/P, S2000/P, M2100/P:
   DVW-M2000/P:
   MSW-A2000/P, M2000/P, M2000E/P, M2100/P, M2100E/P:
   Go to "8-4-3. Betacam/Betacam SP Format PB System Adjustment".

8-4-3. Betacam / Betacam SP Format PB System (EQ RF Output Level) Adjustment

Note

For HDW-2000/D2000, DVW-2000/P and MSW-2000, this adjustment is not required.

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Analog composite video monitor

  Note

  Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
- Extension board: EX-739
- Alignment tapes: CR5-1B, CR5-2A, CR5-1B PS and CR5-2A PS

Preparation

1. Extend the DM-123 board with an extension board EX-739.

Note

After turning off the power, remove the DM-123 board.

2. Check the settings for adjustment.

Refer to Section 8-4-1.

3. Warming up

Before starting the adjustment, warm up the VTR and equipment through the power for 20 minutes or more.

1. Entering the Maintenance Mode and Setting the Initial Data Setting

Note

Check that the playback system is set to the standard mode as below:

- NTSC model: 59.94 Hz or 525 mode
- PAL model: 50 Hz or 625 mode

1. Enter the maintenance mode.
2. Enter A30 : RF GAIN VR (EQ VR) menu.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A30 : RF GAIN VR (EQ VR)
3. When the EQ-84 board or NV-RAM (IC900/EQ-84 board) is replaced, set the following all the items of A30 : RF GAIN VR (EQ VR) to the following initial data.

Item (A30 : RF GAIN VR (EQ VR))	Initial data NTSC model in 59.94 Hz, 525	PAL model in 50 Hz, 625
RF GAIN METAL-Y-A	1B	2A
RF GAIN METAL-Y-B	1B	2A
RF GAIN METAL-C-A	17	1F
RF GAIN METAL-C-B	17	1F
RF GAIN OXIDE-Y-A	17	2E
RF GAIN OXIDE-Y-B	17	2E
RF GAIN OXIDE-C-A	17	24
RF GAIN OXIDE-C-B	17	24

Notes

- How to change the data
  (1) Turn the MULTI CONTROL knob to align asterisk cursol (*) with the desired item.
  (2) To change the data, turn the MULTI CONTROL knob while pressing the HOME button.
- How to eject the cassette tape
  Pressing the EJECT button while starting menu A3x or A4x of the maintenance mode will not eject the cassette tape. Eject the following method.
  (1) Press the F5 (SET) button once when a direction to eject has appeared.
    - A white square appears in the right corner of the superimposed screen of the video monitor to show that the cassette is possible to eject.
  (2) Press the EJECT button to eject the cassette tape.
  (3) Press the F6 (EXIT) button once.
    - The white square on the video monitor will disappear.

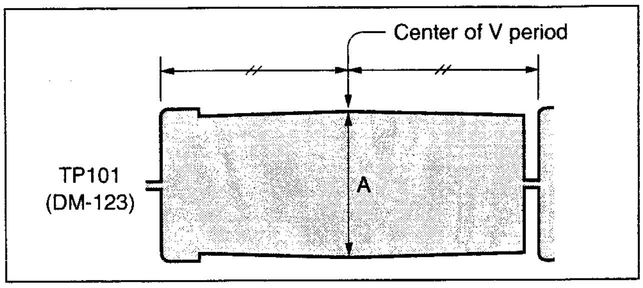
  Note

  In this description it is supplemented as “F5 ⇨ EJECT ⇨ F6”.

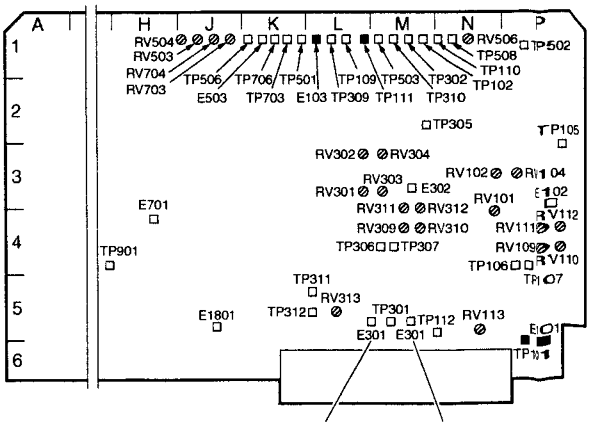
2. METAL Y Adjustment

Alignment tape: for 59.94 Hz or 525 mode: CR5-1B
for 50 Hz or 625 mode: CR5-1B PS

1. Connect and set the oscilloscope as follows:
   Band width limit: ON (20 MHz)
   CH-1: TP101/DM-123(P-6), AC 100 mV/DIV,
   GND: E101/DM-123(P-6)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV,
   GND: E103/DM-123(L-1)
   TIME: 2 ms/DIV
   TRIG: CH-2
2. Play back the flat field signal portion (24:00 to 26:00) of the CR5-1B/CR5-1B PS alignment tape.
3. Set the oscilloscope's trigger slope to – , then adjust the level of METAL Y-A (ch-A of METAL Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) :
   RF GAIN METAL-Y-A
   Specification: A = 500 ±20 mV p-p
4. Set the oscilloscope's trigger slope to + , then adjust the level of METAL Y-B (ch-B of METAL Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) :
   RF GAIN METAL-Y-B
   Specification: A = 500 ±20 mV p-p
5. Switch the polarity (–/+) of the oscilloscope's trigger slope to check the level difference between the METAL Y-A and METAL Y-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
TP101
(DM-123)
A

6. Stop the playback of the alignment tape.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RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP310
TP302
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV311
RV312
RV112
E701
RV309
RV310
RV111
TP306
TP307
RV109
TP901
TP106
RV110
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101

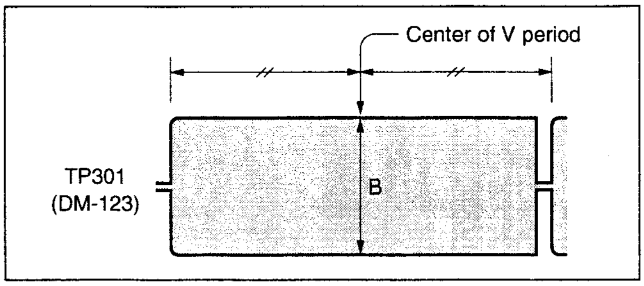
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

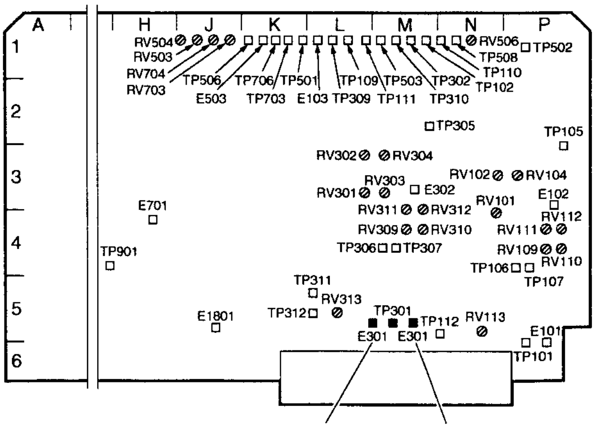
3. METAL C Adjustment

1. Change the connection of the oscilloscope's CH-1 as follows:
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH-2.)
   CH-1: TP301/DM-123(M-5),
   GND: E301/DM-123(L-5)

2. Play back the flat field signal portion (24:00 to 26:00) of the alignment tape CR5-1B / CR5-1B PS.
3. Set the oscilloscope's trigger slope to − , then adjust the level of METAL C-A (ch-A of METAL C).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-A
   Specification: B = 500 ±20 mV p-p
4. Set the oscilloscope's trigger slope to + , then adjust the level of METAL C-B (ch-B of METAL C).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-B
   Specification: B = 500 ±20 mV p-p
5. Switch the polarity (−/+) of the oscilloscope's trigger slope to check the level difference between the METAL C-A and METAL C-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
TP301
(DM-123)
B

6. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)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RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP109
TP309
TP111
TP503
TP302
TP310
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV112
E701
RV311
RV312
RV309
RV310
RV111
TP306
TP307
RV109
RV110
TP901
TP106
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

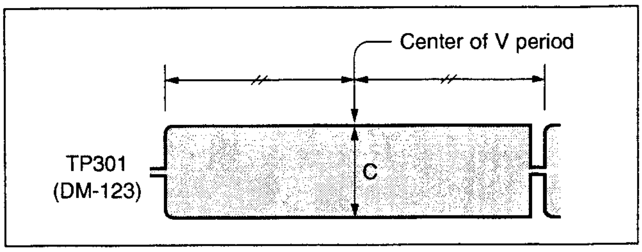
4. OXIDE C Adjustment

Alignment tape: for 59.94 Hz or 525 mode: CR5-2A
for 50 Hz or 625 mode: CR5-2A PS

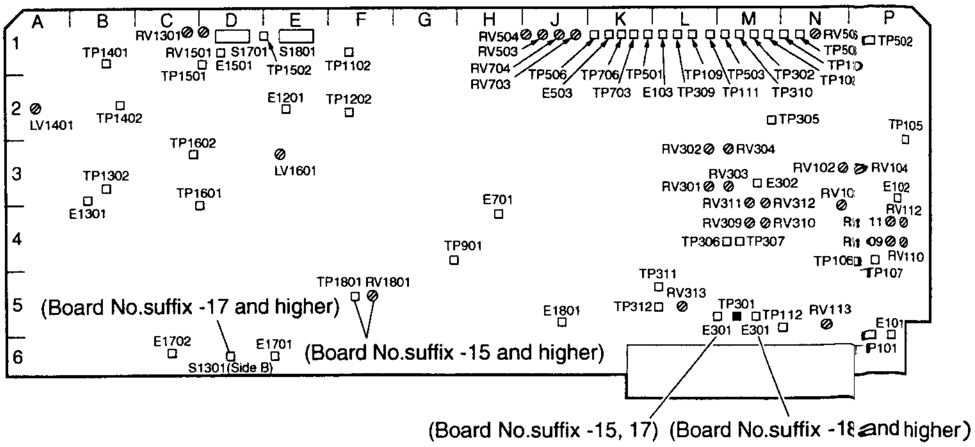
Note

The connections and settings of the oscilloscope are the same as "METAL C Adjustment".

1. Play back the 75% color-bar signal portion (0:00 to 3:00) of the CR5-2A/CR5-2A PS alignment tape.
2. Set the oscilloscope's trigger slope to – , then adjust the level of OXIDE C-A (ch-A of OXIDE C).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE C-A
   Specification: C = 300 ±20 mV p-p
3. Set the oscilloscope's trigger slope to + , then adjust the level of OXIDE C-B (ch-B of OXIDE C).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE C-B
   Specification: C = 300 ±20 mV p-p
4. Switch the polarity (–/+) of the oscilloscope's trigger slope to check the level difference between the OXIDE C-A and OXIDE C-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
TP301
(DM-123)
C

5. Stop the playback of the alignment tape.


A
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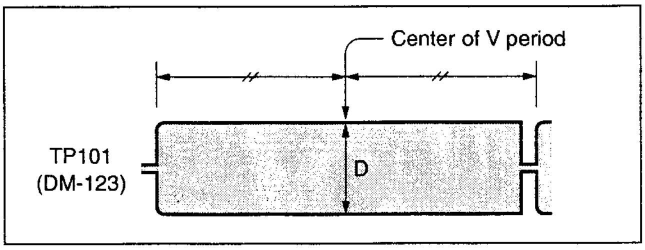
RV1301
RV1501
S1701
S1801
TP1401
E1501
TP1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
E701
TP901
TP1801 RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
(Board No.suffix -15 and higher)
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
E503
TP703
E103
TP309
TP111
TP310
TP502
TP305
TP105
RV302
RV304
RV303
RV102
RV104
RV301
E302
E102
RV311
RV312
RV112
RV309
RV310
TP306
TP307
TP106
RV110
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
P101
(Board No.suffix -15, 17)
(Board No.suffix -1 and higher)

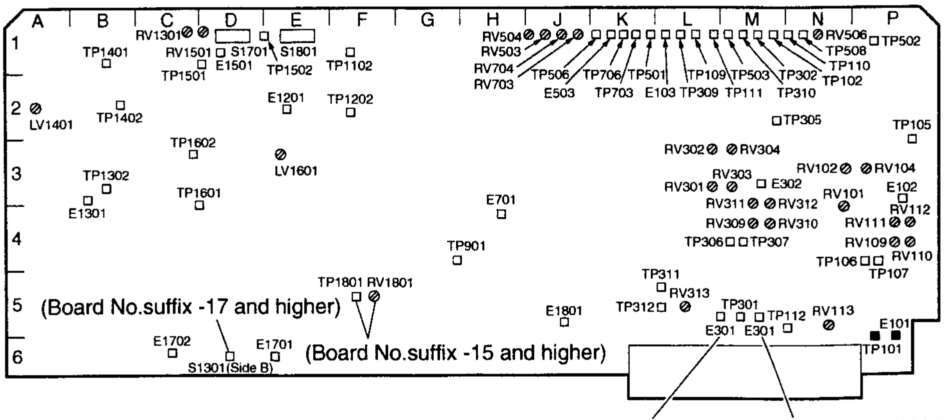
DM-123 Board (Side A)

5. OXIDE Y Adjustment

1. Change the connection of the oscilloscope's CH-1 as follows:
   CH-1: TP101/DM-123(P-6)
   GND: E101/DM-123(P-6)
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH-2.)
2. Play back the 75% color-bar signal portion (0:00 to 3:00) of the alignment tape CR5-2A / CR5-2A PS.
3. Set the oscilloscope's trigger slope to − , then adjust the level of OXIDE Y-A (ch-A of OXIDE Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE Y-A
   Specification: D = 350 ±20 mV p-p
4. Set the oscilloscope's trigger slope to + , then adjust the level of OXIDE Y-B (ch-B of OXIDE Y).
   Adj. point: A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE Y-B
   Specification: D = 350 ±20 mV p-p
5. Switch the polarity (−/+) of the oscilloscope's trigger slope, to check the level difference between the OXIDE Y-A and OXIDE Y-B. And then fine-adjust each level until their amplitudes appear to be identical.


Center of V period
TP101
(DM-123)
D

6. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)
7. To exit A30 : RF GAIN VR (EQ VR) , press the F6 (EXIT) button once.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RV1301
RV1501
S1701
S1801
TP1401
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP302
TP310
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
E701
TP901
TP106
RV110
TP107
TP1801
RV1801
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E101
TP101
E1702
E1701
S1301(Side B)
(Board No.suffix -17 and higher)
(Board No.suffix -15 and higher)
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

6. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" is displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to the previous condition, execute "ALL DATA PREVIOUS".

2. Exit the maintenance mode.
3. **HDW-M2000/P, S2000/P, M2100/P:**
   MSW-A2000/P, M2000/P, M2000E/P, M2100/P, M2100E/P:
   Go to "7. Switching to Alternative Mode" for adjustments in the alternative mode.
   After completing adjustments in the alternative mode, switch the operation mode to the standard mode. The RF system adjustment is now completed.
   DVW-M2000/P:
   The RF system adjustment is now completed.

7. Switching to Alternative Mode

1. Switch the setting of the setup menu to the following mode. (Refer to the operation manual.)

Setup menu	Model	Alternative mode
ITEM-013	NTSC	50 Hz or 625
	PAL	59.94 Hz or 525

2. Switch the video system of the video monitor to 625 mode (PAL) or 525 mode (NTSC).

8. Initial Data Setting (Alternative Mode)

Note

Perform the following steps only when the EQ-84 board or NV-RAM(IC900/EQ-84 board) is replaced.

1. Enter the maintenance mode.
2. Enter A30 : RF GAIN VR (EQ VR).
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A30 : RF GAIN VR (EQ VR)
3. Set all the item of the A30 : RF GAIN VR (EQ VR) to the following initial data.

Item (A30 : RF GAIN VR (EQ VR))	Initial data NTSC model in 59.94 Hz, 525	PAL model in 50 Hz, 625
RF GAIN METAL-Y-A	1B	2A
RF GAIN METAL-Y-B	1B	2A
RF GAIN METAL-C-A	17	1F
RF GAIN METAL-C-B	17	1F
RF GAIN OXIDE-Y-A	17	2E
RF GAIN OXIDE-Y-B	17	2E
RF GAIN OXIDE-C-A	17	24
RF GAIN OXIDE-C-B	17	24

4. Enter A3F : NV-RAM : CONTROL menu.
   Execute "SAVE ALL ADJUST DATA".

9. Adjustment in the Alternative Mode

Go to the step shown below to perform adjustments for the digital format which is capable of playback.

HDW-M2000/P, S2000/P, M2100/P:
Go to "1. HDCAM Format" in Section 8-4-2.
After completing adjustments in the alternative mode, switch the operation mode to the 24 Hz mode with the setup menu ITEM-013, and then carry out again "1. HDCAM Format".
Then switch the operation mode to the standard mode.
MSW-A2000/P:
Go to "3-A. MPEG IMX Format" in Section 8-4-2.
MSW-M2000/P, M2000E/P, M2100/P, M2100E/P:
Go to "2. Digital Betacam Format" in Section 8-4-2.

Then perform Step 2 through Step6 (from "METAL Y Adjustment" to "Saving the Data") in Section 8-43.

8-4-4. Recording Current Adjustment (for Recorder Only)

Models to be adjusted: HDW Recorder
DVW Recorder
MSW Recorder

When the recording current adjustment is required independently of the standard RF system alignment, perform this adjustment as described in this section.
(Refer to Section "8-4-2. Itemized Digital Format RF System Adjustments" regarding the standard recording current adjustment in the RF system adjustment.)

Tools

- Analog composite video monitor
- Cleaning tape: BCT-HD12CL
- Recording tape:

HDW series:	BCT-HD series
DVW series:	BCT-D series
MSW series:	BCT-MX series

Note

Use the blank tape erased using the tape eraser, etc. in advance or a new blank tape.

Preparation

1. Clean with the cleaning tape.

Insert the cleaning tape (BCT-HD12CL).

- The EJECT button blinks, and the PLAY button light. Then the cleaning tape is played back for about five seconds, before it is automatically ejected.

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-4-1.)
- Warming up of equipment to be used (20 minutes or more).

Recording Current Adjustment

1. Insert the recording tape.
2. Enter the maintenance mode.
3. Select the menu (A132/A122/A112) of REC CURRENT.

   HDW series:
   Maintenance mode → M1 : ADJUST → A1 : RF → A13 : HD RF ADJUST → A132 : REC CURRENT
   DVW series:
   Maintenance mode → M1 : ADJUST → A1 : RF → A12 : DB RF ADJUST → A122 : REC CURRENT
   MSW series:
   Maintenance mode → M1 : ADJUST → A1 : RF → A11 : IMX RF ADJUST → A112 : REC CURRENT

   - Message "Auto Adjust (Push SET)" is displayed on the video monitor.
4. Turn the MULTI CONTROL knob to align the asterisk cursor (*) with "ALL".
5. To execute the automatic adjustment for the recording current, press the F5 (SET) button.
   - Message "Auto Adjust Complete" will be displayed on the video monitor when this adjustment is completed normally.
6. To exit A132/A122/A112 : REC CURRENT, press F6 (EXIT) button once.

Saving the Data

Note

Do not save the adjustment data if the automatic adjustment was not completed properly.

7. Enter A1F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

8. Exit the maintenance mode.
9. Eject the recording tape.

8-5. Audio System Adjustment

8-5-1. Adjustment Overview

The audio system of this VTR needs to adjust the analog audio system only. For the digital audio system, any adjustment is not needed.

Tools

The following equipment (or equivalent) and fixtures are required:

Note

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 20 minutes or more.

Tools	Type	Part No.	HDW-				DVW-		MSW-			
			2000 D2000	M2000 M2000P	S2000 S2000P	M2100 M2100P	2000 2000P	M2000 M2000P	2000	A2000 A2000P	M2000 M2000P M2000E M2000EP	M2100 2100P M2100E M2100EP
Audio analyzer	Audio Precision System One or System Two or Tektronix AA501A-option 02		O	O	O	O	O	O	O	O	O	O
Note The audio analyzer should be filtered through 80 kHz LPF throughout adjustment.												
Audio signal generator	Tektronix SG5010		O	O	O	–	O	O	O	O	O	–
Audio level meter	Hewlet-Packard HP3400A		O	O	O	O	O	O	–	O	O	O
Digital voltmeter	Advantest TR6845		O	O	O	O	O	O	–	–	O	O
Oscilloscope	Tektronix TDS460A		O	O	O	O	O	O	–	O	O	O
Frequency counter	Advantest TR5821		O	O	O	–	O	O	–	–	–	–
Shorting clip			O	O	O	O	O	O	O	O	O	O
Analog composite video monitor			O	O	O	O	O	O	O	O	O	O
Note Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT 3 (SUPER) connector.												
Extension board	EX-739	A-8324-911-A	O	O	O	O	O	O	O	O	O	O
	EX-797	A-8327-683-A	O	O	O	O	O	O	–	–	O	O
Cleaning cloth		3-184-527-01	O	O	O	O	O	O	O	O	O	O
Cleaning fluid		9-919-573-01	O	O	O	O	O	O	O	O	O	O
Cleaning tape	Sony BCT-HD12CL		–	O	–	O	–	O	–	O	O	O
Alignment Tapes	HR5-1A	8-960-076-01	O	O	O	O	–	–	–	–	–	–
	ZR5-1	8-960-073-01	–	–	–	–	N	N	–	–	N	N
	ZR5-1P	8-960-073-51	–	–	–	–	P	P	–	–	P	P
	CR5-1B	8-960-096-41	–	N	–	N	–	N	–	N	N	N
	CR5-1B PS	8-960-096-91	–	P	–	P	–	P	–	P	P	P
	CR8-1A	8-960-097-45	–	N	N	N	–	N	–	N	N	N
	CR8-1A PS	8-960-098-45	–	P	P	P	–	P	–	P	P	P
	CR8-1B PS	8-960-096-85	–	P	P	P	–	P	–	P	P	P
Recorded tape	Sony BCT-SP (Betacam SP cassette)		–	O	O	O	–	O	–	O	O	O
Note Be sure to record no signal to the LAU tracks with a Betacam SP videocassette recorder in advance.												
Recording tape	Sony BCT-HD (HDCAM cassette)		O	O	O	–	–	–	–	–	–	–
	Sony BCT-D (Digital Betacam cassette)		–	–	–	–	O	O	–	–	–	–
Note Use a new blank tape or no recorded tape that has been erased with a tape eraser in advance for recorder adjustments.												

O: Required N: Required for NTSC model P: Required for PAL model –: Not required

Adjustments

Section	Item (Section title)		Adjustment point	Measurement point
8-5-3	Analog audio output system adjustment (APR-52 board)			
	Output level adjustment	CH1	⊘RV500/APR-52	AUDIO OUTPUT CH1
		CH2	⊘RV600/APR-52	AUDIO OUTPUT CH2
		CH3	⊘RV700/APR-52	AUDIO OUTPUT CH3
		CH4	⊘RV800/APR-52	AUDIO OUTPUT CH4
		L	⊘RV900/APR-52	MONITOR OUTPUT L
		R	⊘RV1000/APR-52	MONITOR OUTPUT R
8-5-4	Analog Audio Input System Adjustment (Recorder) (APR-52 board)			
	Input Level Adjustment	CH1	⊘RV100/APR-52, ⊘RV101/APR-52	AUDIO OUTPUT CH1
		CH2	⊘RV200/APR-52, ⊘RV201/APR-52	AUDIO OUTPUT CH2
		CH3	⊘RV300/APR-52, ⊘RV301/APR-52	AUDIO OUTPUT CH3
		CH4	⊘RV400/APR-52, ⊘RV401/APR-52	AUDIO OUTPUT CH4
	Distortion Rate Adjustment	CH4	⊘RV402/APR-52	AUDIO OUTPUT CH4
		CH3	⊘RV302/APR-52	AUDIO OUTPUT CH3
		CH2	⊘RV202/APR-52	AUDIO OUTPUT CH2
		CH1	⊘RV102/APR-52	AUDIO OUTPUT CH1
8-5-5	LAU PB System Adjustment (Analog Betacam) (AU-272/AE-31 boards)			
	LAU Dolby Level Pre-adjustment	CH1	⊘RV103/AE-31 ⊘RV100/AU-272	TP100/AE-31 TP100/AU-272
		CH2	⊘RV204/AE-31 ⊘RV200/AU-272	TP202/AE-31 TP200/AU-272
	LAU PB Level Pre-adjustment	CH2	⊘RV201/AU-272	AUDIO OUTPUT CH2
		CH1	⊘RV101/AU-272	AUDIO OUTPUT CH1
	LAU PB Freq. Response Adj.	CH1	⊘RV101/AE-31, ⊘RV100/AE-31 (S100/AE-31)	AUDIO OUTPUT CH1
		CH2	⊘RV201/AE-31, ⊘RV200/AE-31 (S200/AE-31)	AUDIO OUTPUT CH2
	LAU Dolby Level Adjustment	CH1	⊘RV103/AE-31 ⊘RV100/AU-272	TP100/AE-31 TP100/AU-272
		CH2	⊘RV204/AE-31 ⊘RV200/AU-272	TP202/AE-31 TP200/AU-272
	LAU PB Level Adjustment	CH2	⊘RV201/AU-272	AUDIO OUTPUT CH2
		CH1	⊘RV101/AU-272	AUDIO OUTPUT CH1
	LAU PB Phase Adjustment		⊘RV205/AE-31	AUDIO OUTPUT CH1/CH2
	TC Insert Cross-talk Adjustment	CH1	⊘RV700/AE-31, ⊘RV702/AE-31	AUDIO OUTPUT CH1
		CH2	⊘RV701/AE-31, ⊘RV703/AE-31	AUDIO OUTPUT CH2
8-5-6	AFM PB System Adjustment (Analog Betacam excluding HDW-S series) (AU-272 board)			
	AFM RF Level Adjustment		⊘RV500/AU-272	TP503/AU-272 TP504/AU-272
	AFM VCO Control Voltage Check		⊘RV501/AU-272 (Suffix -13 and higher)	TP551/AU-272
			⊘LV550/AU-272 (Suffix -12)	TP551/AU-272
	AFM Demodulate Balance Check	CH3	⊘RV600/AU-272	AUDIO OUTPUT CH3
		CH4	⊘RV700/AU-272	AUDIO OUTPUT CH4
	AFM PB Level Adjustment	CH4	⊘RV701/AU-272	AUDIO OUTPUT CH4
		CH3	⊘RV601/AU-272	AUDIO OUTPUT CH3

Continued

Section	Item (Section title)	Adjustment point	Measurement point
8-5-7	CUE PB System Adjustment (HDW/DVW/MSW-M series)/CUE-13/AE-31 boards		
	CUE PB Level Adjustment	⊘RV300/AE-31	TP102/CUE-13
	CUE Output Level Adjustment	⊘RV104/CUE-13	CUE OUT
	CUE PB VCA Adjustment	⊘RV102/CUE-13	CUE OUT
	CUE PB Freq. Response Adj.	⊘RV203/AE-31	CUE OUT
	CUE Meter Level Adjustment	⊘RV105/CUE-13	TP103/CUE-13
	CUE Meter Offset Adjustment	⊘RV106/CUE-13	CUE Meter
8-5-8	CUE REC System Adjustment (HDW/DVW recorder)/CUE-13/AE-31 boards		
	CUE Input Level Adjustment	⊘RV100/CUE-13	CUE OUT
	CUE REC VCA Adjustment	⊘RV101/CUE-13	CUE OUT
	CUE REC VCA Distortion Ratio Adj.	⊘RV103/CUE-13	CUE OUT
	CUE Erase Current Adjustment	⊘LV600/AE-31	TP601/AE-31
	CUE Bias Frequency Adjustment	⊘T500/AE-31	TP500/AE-31
	CUE Bias Trap Adjustment	⊘LV400/AE-31	TP401/AE-31
	CUE Bias Current Adjustment	⊘RV500/AE-31	TP200/AE-31
	CUE REC Level Adjustment	⊘RV400/AE-31	CUE OUT
	CUR REC Freq. Response adj.	⊘RV401/AE-31	CUE OUT

8-5-2. Common Preparation

Set switches on boards, control panel, function menu, and others specified before starting the adjustments. Return the settings to the customer settings after completing the audio system adjustment.

1. Switches settings

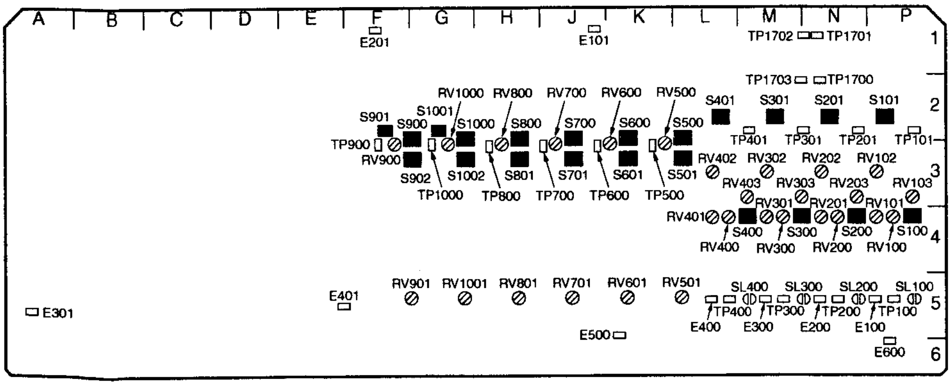
Reset the switches on the APR-52 and CUE-13 boards to the factory settings.

Notes

- Turn off the power before removing the APR-52 and CUE-13 boards and changing the switch plugs setting.
- [R]: for recorder only

Board	Ref. No. (Address)	Item	Customer setting	Factory setting
APR-52	[R] S100 (P-4)	Analog audio CH1 input level		⇨ +4 to ON, others to OFF
	S101 (P-2)	Analog audio CH1 input headroom		⇨ 20 to ON, others to OFF
	[R] S200 (N-4)	Analog audio CH2 input level		⇨ +4 to ON, others to OFF
	S201 (N-2)	Analog audio CH2 input headroom		⇨ 20 to ON, others to OFF
	[R] S300 (N-4)	Analog audio CH3 input level		⇨ +4 to ON, others to OFF
	S301 (M-2)	Analog audio CH3 input headroom		⇨ 20 to ON, others to OFF
	[R] S400 (M-4)	Analog audio CH4 input level		⇨ +4 to ON, others to OFF
	S401 (L-2)	Analog audio CH4 input headroom		⇨ 20 to ON, others to OFF
	S500 (L-2)	Analog audio CH1 output headroom		⇨ 20 to ON, others to OFF
	S501 (L-3)	Analog audio CH1 output level		⇨ +4 to ON, others to OFF
	S600 (K-2)	Analog audio CH2 output headroom		⇨ 20 to ON, others to OFF
	S601 (K-3)	Analog audio CH2 output level		⇨ +4 to ON, others to OFF
	S700 (J-2)	Analog audio CH3 output headroom		⇨ 20 to ON, others to OFF
	S701 (J-3)	Analog audio CH3 output level		⇨ +4 to ON, others to OFF
	S800 (H-2)	Analog audio CH4 output headroom		⇨ 20 to ON, others to OFF
	S801 (H-3)	Analog audio CH4 output level		⇨ +4 to ON, others to OFF
	S900 (G-2)	Monitor L output headroom		⇨ 20 to ON, others to OFF
	S901 (F-2)	Monitor L output level, fixed or variable		⇨ U to ON, others to OFF
	S902 (G-3)	Monitor L output level		⇨ +4 to ON, others to OFF
	S1000 (G-2)	Monitor R output headroom		⇨ 20 to ON, others to OFF
	S1001 (G-2)	Monitor R output level, fixed or variable		⇨ U to ON, others to OFF
	S1002 (G-3)	Monitor R output level		⇨ +4 to ON, others to OFF
CUE-13*1	[R] S100*2 (C-1)	CUE input level		⇨ +4 to ON, others to OFF
	S101 (A-2)	CUE output level		⇨ +4 to ON, others to OFF

*1 : This board is not mounted in MSW-2000/A2000/A2000P.
*2 : For HDW/DVW series only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RV1000 RV800 RV700 RV600 RV500
S901 S1001 S900 S1000 S800 S700 S600 S500 S401 S301 S201 S101
TP900 RV900 TP401 TP301 TP201 TP101
S902 S1002 S801 S701 S601 S501
RV402 RV302 RV202 RV102 RV403 RV303 RV203 RV103
TP1000 TP800 TP700 TP600 TP500
RV301 RV201 RV101 RV401
S400 S300 S200 S100
RV400 RV300 RV200 RV100
RV901 RV1001 RV801 RV701 RV601 RV501
SL400 SL300 SL200 SL100
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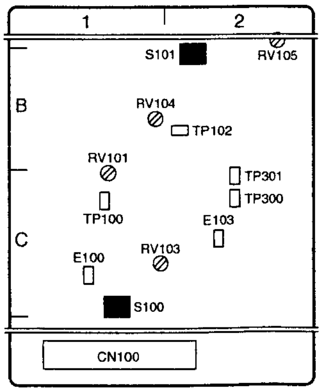
E401 E301 E500 E400 E300 E200 E100 E600

APR-52 Board (Side A)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RV104 TP102
RV101 TP301 TP300
TP100 E103
RV103 E100
S100
CN100

CUE-13 Board (Side A)

2. Check the Operation Mode (HDW/MSW series)

Check that the operation mode is set to the standard mode. If not, change the setting of the setup menu ITEM-013. (Refer to the operation manual.)

- NTSC model: 525 or 59.94 Hz mode
- PAL model: 625 or 50 Hz mode

3. Other settings

Note

[R]: for recorder only

Location	Item		Customer setting	Setting at adjustment
Upper control panel	REMOTE	1 (9P)	____________	⇨ OFF (Light off)
		2 (50P)	____________	⇨ OFF (Light off)
Lower control panel	PB controls	CH1	____________	⇨ PRESET
		CH2	____________	⇨ PRESET
		CH3	____________	⇨ PRESET
		CH4	____________	⇨ PRESET
		CH5 to CH8 *1	____________	⇨ PRESET
		CUE *2	____________	⇨ PRESET
	REC controls	[R] CH1	____________	⇨ PRESET
		[R] CH2	____________	⇨ PRESET
		[R] CH3	____________	⇨ PRESET
		[R] CH4	____________	⇨ PRESET
		[R] CH5 to CH8 *1	____________	⇨ PRESET
		[R] CUE *2	____________	⇨ PRESET
	AUDIO INPUT SELECT	[R] CH1	____________	⇨ ANALOG/AES/EBU
		[R] CH2	____________	⇨ ANALOG/AES/EBU
		[R] CH3	____________	⇨ ANALOG/AES/EBU
		[R] CH4	____________	⇨ ANALOG/AES/EBU
	MONITOR	L	____________	⇨ CH1
		R	____________	⇨ CH2
Switch panel	KEY INHIBIT switch		____________	⇨ OFF
Function menu	Page3	F4 (EMPHSS)	____________	⇨ OFF
	Page4	F3 (DOLBY) *3	____________	⇨ NR OFF
		F4 (CHARA)	____________	⇨ ON
Maintenance menu	M370 : METER HEAD ROOM		____________	⇨ 20 dB
Connector panel	[R] AUDIO INPUT CH1 LEVEL switch		____________	⇨ HIGH/ON 600Ω (Set to the right position.)
	[R] AUDIO INPUT CH2 LEVEL switch		____________	⇨ HIGH/ON 600Ω (Set to the right position.)
	[R] AUDIO INPUT CH3 LEVEL switch		____________	⇨ HIGH/ON 600Ω (Set to the right position.)
	[R] AUDIO INPUT CH4 LEVEL switch		____________	⇨ HIGH/ON 600Ω (Set to the right position.)
	[R] CUE IN LEVEL switch *2		____________	⇨ HIGH/ON 600Ω (Set to the right position.)

*1 : For MSW series only
*2 : For HDW/DVW series only
*3 : Not for HDW-2000/D2000, DVW-2000/P and MSW-2000

8-5-3. Analog Audio Output System Adjustment/APR-52 Board

Tools

- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Extension board: EX-739
- Analog composite video monitor

Note

This monitor is for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Preparation

1. Extend the APR-52 board with an extension board EX-739.

After turning off the power, extend the APR-52 board.

2. Check the settings.

(Refer to "8-5-2. Common Preparation")

3. Check that the equipment has warmed up.

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 20 minutes or more.

Output Level Adjustment

1. Enter the maintenance mode.
2. Enter the C23 : AUDIO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C23 : AUDIO TEST SG
3. Select "1 kHz SINE 0VU" as test signal.
4. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV500/APR-52(K-3)
   Specification: +4.0 ±0.1 dBm (at 600 Ω load)

CH2 adjustment

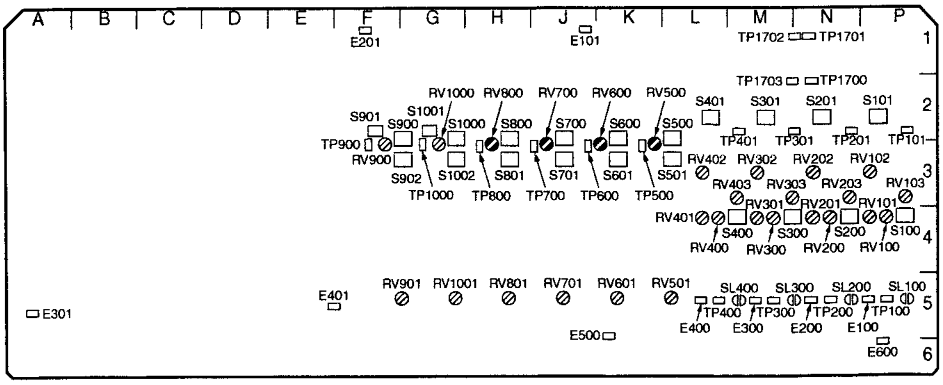
7. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
8. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV600/APR-52(K-3)
   Specification: +4.0 ±0.1 dBm (at 600 Ω load)

CH3 adjustment

9. Connect the audio analyzer's input to AUDIO OUTPUT CH3 connector.
10. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV700/APR-52(J-3)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)

CH4 adjustment

11. Connect the audio analyzer's input to AUDIO OUTPUT CH4 connector.
12. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV800/APR-52(H-3)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)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APR-52 Board (Side A)

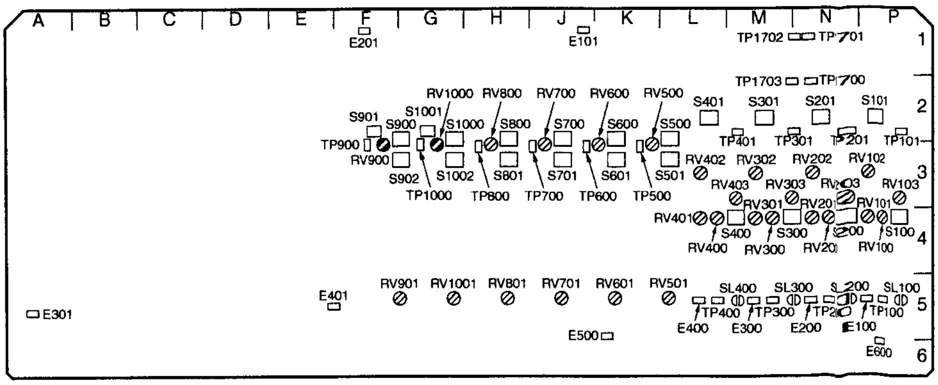
MONITOR L channel adjustment

13. Connect the audio analyzer's input to MONITOR OUTPUT L connector.
14. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV900/APR-52(F-3)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)

MONITOR R channel adjustment

15. Connect the audio analyzer's input to MONITOR OUTPUT R connector.
16. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV1000/APR-52(G-3)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)

17. Exit the maintenance mode.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APR-52 Board (Side A)

8-5-4. Analog Audio Input System Adjustment (for Recorder Only) /APR-52 Board

Note

Models to be adjusted: HDW Recorder
DVW Recorder
MSW Recorder

Tools

- Audio signal generator:
  Tektronix SG5010 or equivalent
- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Extension board: EX-739
- Shorting clip

Preparation

1. Conditions to be kept are:

- Extension of the APR-52 board.
- Settings for adjustment. (Refer to "8-5-2. Common Preparation".)
- Warming up of equipment to be used (20 minutes or more).

1. Input Level Adjustment

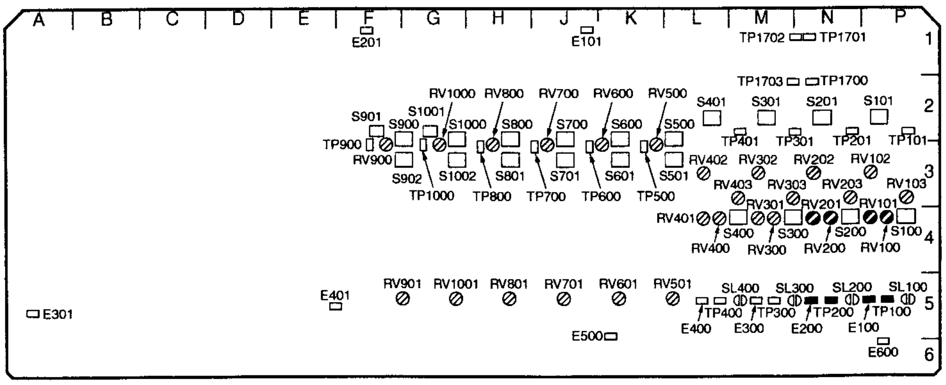
1. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH1 adjustment

2. Short-circuit TP100(P-5) and E100(P-5) on the APR-52 board with a shorting clip.
3. Input the audio signal (1 kHz, +4.0 dBm) to AUDIO INPUT CH1 connector.
4. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
5. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV100/APR-52(P-4)
   Specification: +4.0 ±0.1 dBm (at 600 Ω load)
6. Remove the shorting clip on the APR-52 board.
7. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV101/APR-52(P-4)
   Specification: +4.0 ±0.1 dBm (at 600 Ω load)

CH2 adjustment

8. Short-circuit TP200(N-5) and E200(N-5) on the APR-52 board with a shorting clip.
9. Input the audio signal (1 kHz, +4.0 dBm) to AUDIO INPUT CH2 connector.
10. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
11. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV200/APR-52(N-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)
12. Remove the shorting clip on the APR-52 board.
13. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV201/APR-52(N-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)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RV300
RV200
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RV1001
RV801
RV701
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RV501
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SL200
SL100
TP400
TP300
TP200
TP100
E301
E400
E300
E200
E100
E500
E600

APR-52 Board (Side A)

CH3 adjustment

14. Short-circuit TP300(M-5) and E300(M-5) on the APR-52 board with a shorting clip.
15. Input the audio signal (1 kHz, +4.0 dBm) to AUDIO INPUT CH3 connector.
16. Connect the audio analyzer's input to AUDIO OUTPUT CH3 connector.
17. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV300/APR-52(M-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)
18. Remove the shorting clip on the APR-52 board.
19. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV301/APR-52(M-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)

CH4 adjustment

20. Short-circuit TP400(L-5) and E400(L-5) on the APR-52 board with a shorting clip.
21. Input the audio signal (1 kHz, +4.0 dBm) to AUDIO INPUT CH4 connector.
22. Connect the audio analyzer's input to AUDIO OUTPUT CH4 connector.
23. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV400/APR-52(L-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)
24. Remove the shorting clip on the APR-40 board.
25. Adjust the audio level on the audio analyzer.
    Adj. point: ⊘RV401/APR-52(L-4)
    Specification: +4.0 ±0.1 dBm (at 600 Ω load)

2. Distortion Rate Adjustment

1. Set the audio analyzer as follows:
   Function mode: THD+N
   Range: 2 %
   Input filter: 80 kHz LPF

CH4 adjustment

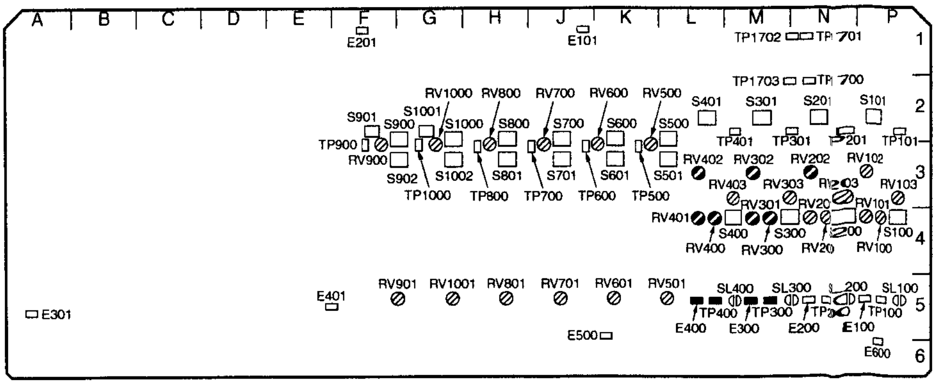
2. Input the audio signal (1 kHz, +23.5 dBm) to AUDIO INPUT CH4 connector.
3. Connect the audio analyzer's input to AUDIO OUTPUT CH4 connector.
4. Adjust the distortion rate on the audio analyzer.
   Adj. point: ⊘RV402/APR-52(L-3)
   Specification: Minimize (0.10 % or less: OK)

CH3 adjustment

5. Input the audio signal (1 kHz, +23.5 dBm) to AUDIO INPUT CH3 connector.
6. Connect the audio analyzer's input to AUDIO OUTPUT CH3 connector.
7. Adjust the distortion rate on the audio analyzer.
   Adj. point: ⊘RV302/APR-52(M-3)
   Specification: Minimize (0.10 % or less: OK)

CH2 adjustment

8. Input the audio signal (1 kHz, +23.5 dBm) to AUDIO INPUT CH2 connector.
9. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
10. Adjust the distortion rate on the audio analyzer.
    Adj. point: ⊘RV202/APR-52(N-3)
    Specification: Minimize (0.10 % or less: OK)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SL400
SL300
SL200
SL100
TP400
TP300
TP200
TP100
E400
E300
E200
E100
E500
E600

APR-52 Board (Side A)

CH1 adjustment

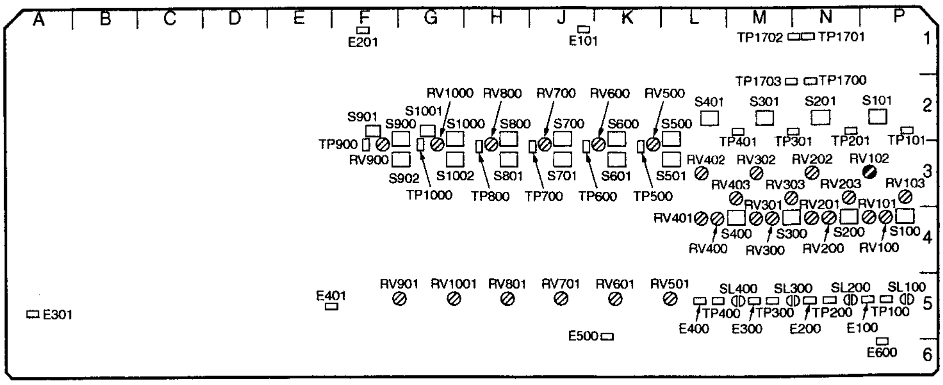
11. Input the audio signal (1 kHz, +23.5 dBm) to AUDIO INPUT CH1 connector.
12. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
13. Adjust the distortion rate on the audio analyzer.

    Adj. point: ⊘RV102/APR-52(P-3)
    Specification: Minimize (0.10% or less: OK)

14. Stop the extending of the APR-52 board.

    Note

    After turning off the power, remove the board.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E200
E100
E600

APR-52 Board (Side A)

8-5-5. LAU PB System Adjustment (Analog Betacam) /AU-272/AE-31 Boards

Note

This adjustment is unnecessary for HDW-2000/D2000, DVW-2000/P and MSW-2000.

Tools

- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Audio level meter:
  Hewlett-Packard HP3400A or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Extension board: EX-739
- Alignment tapes
  For NTSC model: CR8-1A
  For PAL model: CR8-1A PS and CR8-1B PS
- Recorded SP tape: BCT-SP series (Betacam SP cassette)

  Note

  Be sure to use a Betacam SP cassette tape that recorded the no signal to the LAU tracks using a Betacam SP videocassette recorder in advance.

- Analog composite video monitor

  Note

  Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Preparation

1. Extend the AU-272 board with an extension board EX-739.

Note

After turning off the power, then remove the AU-272 board.

2. Open the AE-31 board

(Refer to the figure in Section 5-1-2.)

3. Clean the AT head.

Clean the tape running surface of the AT head.
(Refer to "4-2-5. Stationary Heads Cleaning".)

Note

Perform the cleaning under the power off.

4. Conditions to be kept are:

- Settings for adjustment. (Refer to "8-5-2. Common Preparation".)
- Warming up of equipment to be used (20 minutes or more).

5. Set the setup extend menu ITEM-F01 to "SW". (PAL model only)

Notes

- The setup extend menu can be changed in the following setting.
  S1502(B-1/SS-89), Bit 1 ⇒ ON
- To display the ITEM-F00 series, turn the MULTI CONTROL knob with the HOME button pressing.
- Return the ITEM-F01 : AUDIO NR IN SP MODE to "ON" after the LAU PB system adjustment are completed.

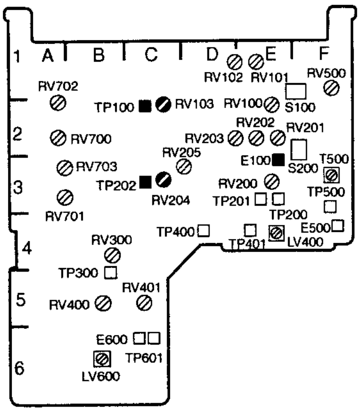
1. LAU Dolby Pre-adjustment

CH1 adjustment

1. Connect the audio level meter to TP100(C-2) on the AE-31 board. GND: E100/AE-31(E-3)
2. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the following alignment tape.
   For NTSC model: CR8-1A
   For PAL model: CR8-1B PS
3. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV103/AE-31(C-2)
   Specification: −10.0 ±0.5 dBu (0 dBu ≒ 0.775 V rms)
4. Connect the audio level meter to TP100(E-1) on the AU-272 board.
   GND: E3/AU-272(E-3) or E600/AU-272(C-1)
5. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
6. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV100/AU-272(E-1)
   Specification: −10.0 ±0.5 dBm (0 dBu ≒ 0.775 V rms)

CH2 adjustment

7. Connect the audio level meter to TP202(C-3) on the AE-31 board. GND: E100/AE-31(E-3)
8. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
9. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV204/AE-31(D-3)
   Specification: −10.0 ±0.5 dBu (0 dBu ≒ 0.775 V rms)
10. Connect the audio level meter to TP200(D-1) on the AU-272 board.
    GND: E3/AU-272(E-3) or E600/AU-272(C-1)
11. Playback the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
12. Adjustment the audio level on the audio level meter.
    Adj. point: ⊘RV200/AU-272(D-1)
    Specification: −10.0 ±0.5 dBu (0 dBu ≒ 0.775 V rms)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RV701
TP200
E500
TP400
4
RV300
TP401
LV400
TP300
RV401
5
RV400
E600
TP601
6
LV600

AE-31 Board (Side A)

2. LAU PB Level Pre-adjustment

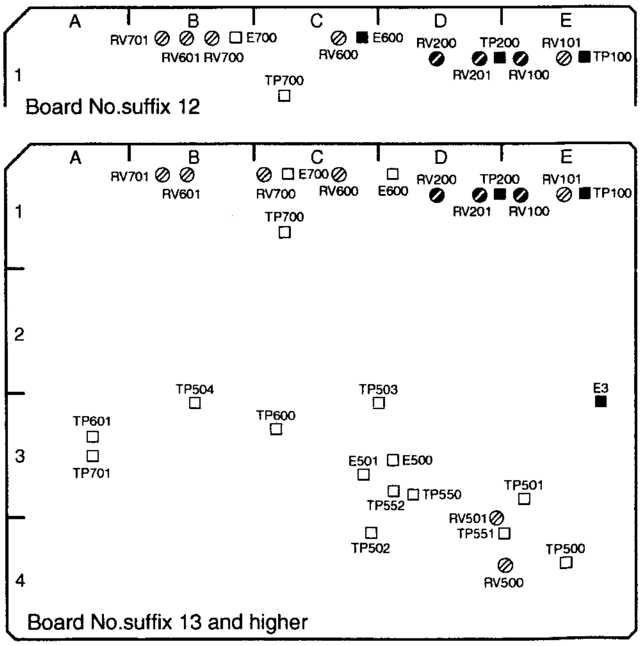
1. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH2 adjustment

2. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
3. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
4. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV201/AU-272(D-1)
   Specification: +4.0 ±0.5 dBm (at 600 Ω load)

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the CR8-1A / CR8-1B PS.
7. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV101/AU-272(E-1)
   Specification: +4.0 ±0.5 dBm (at 600 Ω load)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Board No.suffix 12
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TP503
E3
TP601
TP600
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TP701
E501
E500
TP550
TP501
TP552
RV501
TP551
TP502
TP500
4
RV500
Board No.suffix 13 and higher

AU-272 Board (Side A)

3. LAU PB Frequency Response Adjustment

1. Set the audio analyzer as follows:
   Function mode: dB RATIO
   Input filter: 80 kHz LPF

CH1 adjustment (OXIDE)

2. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
3. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the alignment tape CR8-1A / CR8-1A PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
4. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1A / CR8-1A PS in PLAY mode.

   Note

   If the adjustment with RV100 becomes out of the specification, change the setting of S100 (F-1) on the AE-31 board, and then retry it.

CH2 adjustment (OXIDE)

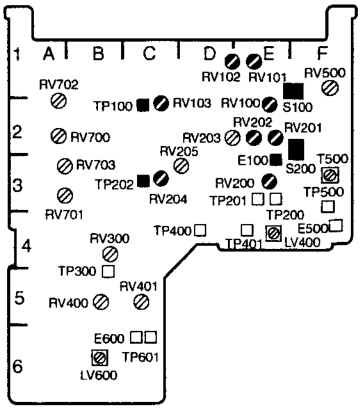
5. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
6. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the CR8-1A / CR8-1A PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
7. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1A / CR8-1A PS in PLAY mode.

   Note

   If the adjustment with RV200 becomes out of the specification, change the setting of S200 (F-3) on the AE-31 board, and then retry it.

	Specification [dB]		
Playback portion	**NTSC model**	**PAL model**	**Adjustment point**
5:00 to 5:55 (1 kHz)	Measured audio level is a reference level (0 dB).		—
6:00 to 6:25 (40 Hz)	C.V. $^{+0.7}_{-1.7}$	C.V. $^{+0.7}_{-1.7}$	(Check only)
6:30 to 6:55 (7 kHz)	C.V. ±0.3	C.V. ±0.4	CH-1: ⊘RV101/AE-31(E-1) CH-2: ⊘RV201/AE-31(E-2)
7:00 to 7:25 (10 kHz)	C.V. ±0.3	C.V. ±0.4	(Check only)
7:30 to 7:55 (15 kHz)	C.V. $^{+0.3}_{-1.0}$	C.V. $^{-0.5}_{-1.7}$	CH-1: ⊘RV100/AE-31(E-2) CH-2: ⊘RV200/AE-31(E-3)

The correction values (C.V.) are given on the label of the alignment tape.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RV703
TP202
RV200
TP500
RV701
RV204
TP201
TP200
RV300
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TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

CH1 adjustment (METAL) for PAL model only

8. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
9. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the alignment tape CR8-1B PS in PLAY mode, and then measure the audio level on the audio analyzer.
   Use this measurement value as the reference level (0 dB).
10. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1B PS in PLAY mode.

CH2 adjustment (METAL) for PAL model only

11. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
12. Play back the 1 kHz, −20 VU portion (5:00 to 5:55) of the CR8-1B PS in PLAY mode, and then measure the audio level on the audio analyzer.
    Use this measurement value as the reference level (0 dB).
13. Check or adjust the dB ratio in response to each frequency portion while playing back the following specified portions (−20 VU) of the CR8-1B PS in PLAY mode.

Playback portion	Specification [dB]	Adjustment point
5:00 to 5:55 (1 kHz)	Measured audio level is a reference level (0 dB).	—
6:00 to 6:25 (40 Hz)	C.V. $^{+0.7}_{-1.7}$	(Check only)
6:30 to 6:55 (7 kHz)	C.V. ±0.3	(Check only)
7:00 to 7:25 (10 kHz)	C.V. ±0.4	(Check only)
7:30 to 7:55 (15 kHz)	C.V. ±0.5	CH-1: ⊘RV102/AE-31(D-1) CH-2: ⊘RV202/AE-31(E-2)

The correction values (C.V.) are given on the label of the alignment tape.

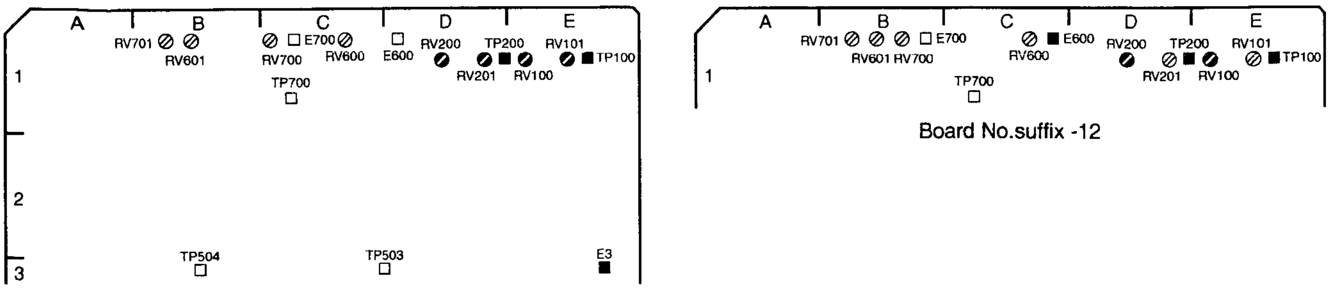
4. LAU Dolby Level Adjustment

CH1 adjustment

1. Connect the audio level meter to TP100(C-2) on the AE-31 board. GND: E100/AE-31(E-3)
2. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
3. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV103/AE-31(C-2)
   Specification: −10.0 ±0.2 dBu (0 dBu ≒ 0.775 V rms)
4. Connect the audio level meter to TP100 (E-1) on the AU-272 board.
   GND: E3/AU-272(E-3) or E600/AU-272(C-1)
5. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
6. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV100/AU-272(E-1)
   Specification: −10.0 ±0.2 dBu (0 dBu ≒ 0.775 V rms)

CH2 adjustment

7. Connect the audio level meter to TP202(C-3) on the AE-31 board. GND: E100/AE-31(E-3)
8. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
9. Adjust the audio level on the audio level meter.
   Adj. point: ⊘RV204/AE-31(D-3)
   Specification: −10.0 ±0.2 dBu (0 dBu ≒ 0.775 V rms)
10. Connect the audio level meter to TP200(D-1) on the AU-272 board.
    GND: E3/AU-272(E-3) or E600/AU-272(C-1)
11. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
12. Adjust the audio level on the audio level meter.
    Adj. point: ⊘RV200/AU-272(D-1)
    Specification: −10.0 ±0.2 dBu (0 dBu ≒ 0.775 V rms)



Board No.suffix -13 and higher

Board No.suffix -12

AU-272 Board (Side A)

5. LAU PB Level Adjustment

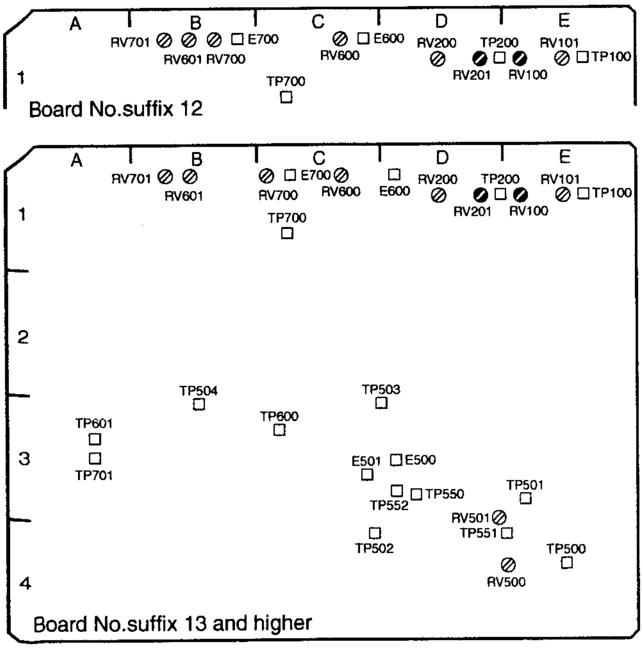
1. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH2 adjustment

2. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
3. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
4. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV201/AU-272(D-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)

CH1 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
6. Play back the 1 kHz, 0 VU portion (0:00 to 2:55) of the alignment tape CR8-1A / CR8-1B PS.
7. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV101/AU-272(E-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)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RV501
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TP502
TP500
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RV500
Board No.suffix 13 and higher

AU-272 Board (Side A)

6. LAU PB Phase Adjustment

1. Connect and set the oscilloscope as follows:
   X-Y mode
   CH-1: Pin 2 (X) of AUDIO OUTPUT CH1 connector
   GND: Pin 1 (G) of it, AC
   CH-2: Pin 2 (X) of AUDIO OUTPUT CH2 connector
   GND: Pin 1 (G) of it, AC

   Note

   An XLR-to-pigtail cable is very convenient to connect between the oscilloscope and the above-mentioned connectors.
   Prepare two XLR-to-pigtail cables for this adjustment. And connect the XLR plug end of the cable to above-mentioned connectors and the pigtailed end to the oscilloscope. The cables for CH-1 and CH-2 shall be the same in length and same wire color on the pigtailed end.

2. **For NTSC model:**
   Play back the 10 kHz, −10 VU portion (3:00 to 4:55) of the alignment tape CR8-1A in PLAY mode.
   For PAL model:
   Play back the 15 kHz, 0 VU portion (3:00 to 4:55) of the alignment tape CR8-1B PS in PLAY mode.
3. Watch the lissajous waveform on the oscilloscope.
4. Align the vertical and horizontal amplitudes of lissajous waveform to 60 mm square with the VOLTS/DIV and VAR controls of the oscilloscope.
5. Minimize the phase difference A of lissajous waveform.
   Adj. point: ⊘RV205/AE-31(D-3)
   Specification: A ≦ 5.2 mm (Refer to Figure 2.)

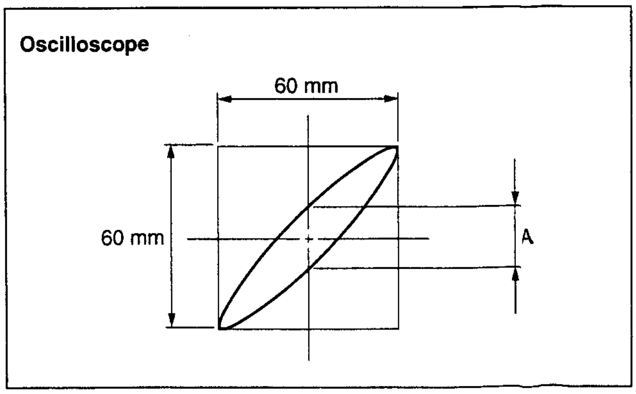

Oscilloscope
60 mm
60 mm
A

Figure 2. Lissajous Waveform of LAU PB Phase Adjustment

7. TC Insert Cross-talk Adjustment (for Recorder Only)

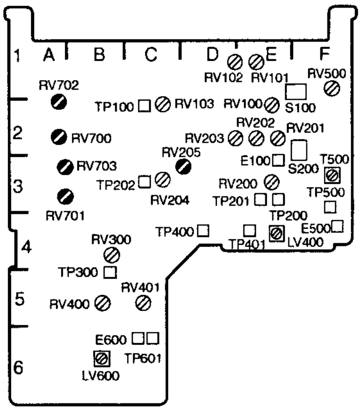
1. Disconnect the cables connected to AUDIO INPUT CH1 and CH2 connectors if connected.
2. Insert the Betacam SP cassette tape that recorded the no signal to the LAU tracks.
3. Set the audio analyzer as follows:
   Function mode: LEVEL
   Input filter: 80 kHz LPF

CH1 adjustment

4. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
5. Press the INSERT TIME CODE button on the lower control panel.
6. Press the PLAY button while pressing the EDIT button.
7. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
   Adj. points: ⊘RV700/AE-31(A-2)
   ⊘RV702/AE-31(A-2)
   Specification: Minimize
   (The level should be less than −18 dBu)
8. Stop the recording.

CH2 adjustment

9. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
10. Press the INSERT TIME CODE button on the lower control panel.
11. Press the PLAY button while pressing the EDIT button.
12. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
    Adj. points: ⊘RV701/AE-31(A-3)
    ⊘RV703/AE-31(A-3)
    Specification: Minimize
    (The level should be less than −18 dBu)
13. Stop the recording, then eject the cassette tape.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RV204
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RV701
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TP400
E500
RV300
TP401
LV400
TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

8. TC Insert Cross-talk Adjustment (for Player Only)

1. Enter the maintenance mode, and then select A6 : LTC REC .
   Maintenance mode → M1 : ADJUST → A6 : LTC REC
2. Insert the Betacam SP cassette tape that recorded the no signal to the LAU tracks.
3. Set the audio analyzer as follows:
   Function mode: LEVEL
   Input filter: 80 kHz LPF

CH1 adjustment

4. Connect the audio analyzer's input to AUDIO OUTPUT CH1 connector.
5. Press the SET button twice in A6 : LTC REC state of the maintenance mode. (Starts TC insert mode.)
6. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
   Adj. points: ⊘RV700/AE-31(A-2)
   ⊘RV702/AE-31(A-2)
   Specification: Minimize
   (The level should be less than −18 dBu)
7. Press the EXIT button. (The tape stops.)

CH2 adjustment

8. Connect the audio analyzer's input to AUDIO OUTPUT CH2 connector.
9. Press the SET button twice in A6 : LTC REC state of the maintenance mode. (Starts TC insert mode.)
10. Adjust the cross-talk level on the audio analyzer. (Alternately adjust the following adj. points.)
    Adj. points: ⊘RV701/AE-31(A-3)
    ⊘RV703/AE-31(A-3)
    Specification: Minimize
    (The level should be less than −18 dBu)
11. Press the EXIT button, then eject the cassette tape.
12. Exit the maintenance mode.

8-5-6. AFM PB System Adjustment (Analog Betacam) /AU-272 Board

Note

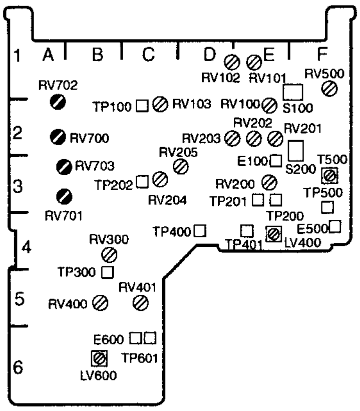
Models to be adjusted: HDW-M series
DVW-M series
MSW-A/MSW-M series

Tools

- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Oscilloscope: Tektronix TDS460A or equivalent
- Extension board: EX-739
- Cleaning tape: BCT-HD12CLN
  (Separately available)
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS
- Analog composite video monitor

  Note

  Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.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AE-31 Board (Side A)

Preparation

1. Clean with the cleaning tape.

Insert the cleaning tape (BCT-HD12CLN), and press the EJECT and PLAY buttons simultaneously.

- The EJECT button blinks and the PLAY button light. And the cleaning tape is played for about 5 seconds, before it is automatically ejected.

2. Set the setup extend menu ITEM-F01 to "SW". (PAL model only)

Notes

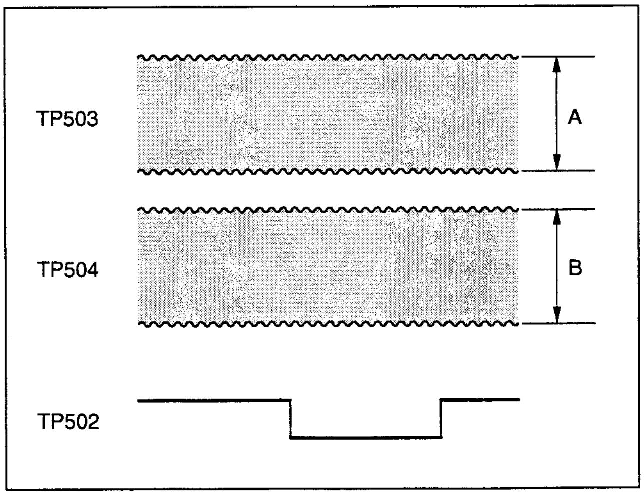
- The setup extend menu can be changed in the following setting.
  S1502(B-1/SS-89), Bit 1 ⇨ ON
- To display the ITEM-F00 series, turn the MULTI CONTROL knob while pressing the HOME button.
- Reset the ITEM-F01 : AUDIO NR IN SP MODE to "ON" after the AFM PB line adjustment are completed.

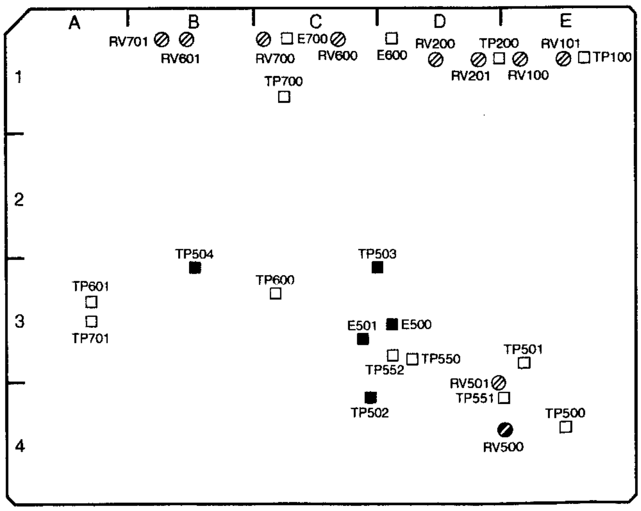
3. Conditions to be kept are:

- Extension of the AU-272 board.
- Settings for adjustment. (Refer to "8-5-2. Common Preparation".)
- Warming up of equipment to be used (20 minutes or more).

1. AFM RF Level Adjustment

1. Connect and set the oscilloscope as follows:
   Band width limit: ON (20 MHz)
   CH-1: TP503/AU-272(C-3) ,
   GND: E500/AU-272(D-3)
   CH-2: TP504/AU-272(B-3) ,
   GND: E501/AU-272(C-3)
   TRIG: TP502/AU-272(C-4) ,
   GND: E501/AU-272(C-3)
   TIME: 5 ms/DIV
2. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
3. Check the RF levels of waveforms on the oscilloscope. If the specification is not satisfied, adjust it.
   Adj. point: ⊘RV500/AU-272(E-4)
   Specifications: A = 450 ± 100 mV p-p
   B = 450 ± 100 mV p-p


TP503
A
TP504
B
TP502


A
B
C
D
E
1
2
3
4
RV701
RV601
RV700
E700
RV600
E600
RV200
TP200
RV101
TP100
RV201
RV100
TP700
TP504
TP503
TP601
TP600
TP701
E501
E500
TP552
TP550
TP501
RV501
TP551
TP502
TP500
RV500

AU-272 Board (Side A)

2. AFM VCO Control Voltage Check

1. Connect and set the oscilloscope as follows:
   CH-1: TP551/AU-272(E-4) ,
   GND: E501/AU-272(C-3)
2. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
3. Check the DC level using the oscilloscope.
   If the specification is not satisfied, adjust it.
   Adj. point:
   ⊘RV501/AU-272(D-4): Board No. suffix -13
   ⊘LV550/AU-272(D-4): Board No. suffix -12
   Specifications: 2.0 ±0.1 V p-p

3. AFM Demodulate Balance Check

1. Set the audio analyzer as follows:
   Function mode: THD +N
   Range: 2 %
   Input filter: 80 kHz LPF

CH3 check

2. Connect the audio analyzer's input to AUDIO OUTPUT CH3 connector.
3. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
4. Check the distortion rate on the audio analyzer.
   Adj. point: ⊘RV600/AU-272(C-1)
   Specifications: Minimize (0.45 % or less: OK)

CH4 check

5. Connect the audio analyzer's input to AUDIO OUTPUT CH4 connector.
6. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
7. Check the distortion rate on the audio analyzer.
   Adj. point: ⊘RV700/AU-272(B-1)
   Specifications: Minimize (0.45 % or less: OK)

4. AFM PB Level Adjustment

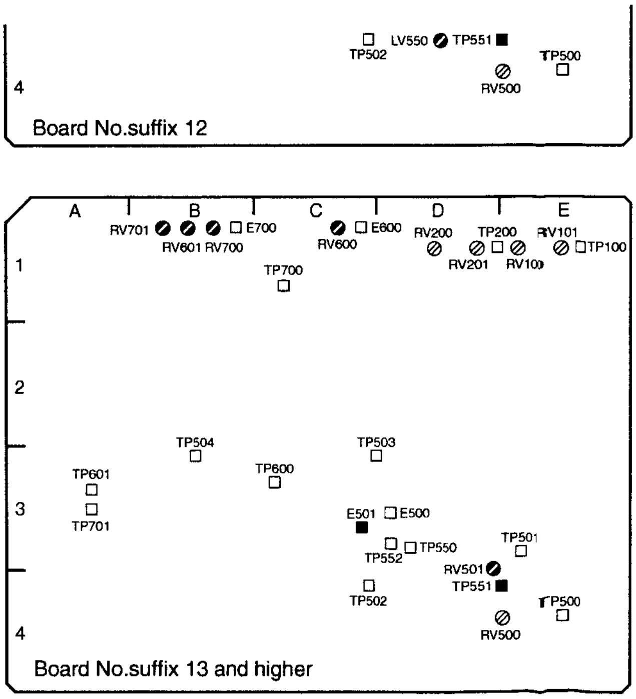
1. Set the audio analyzer as follows:
   Function mode: LEVEL, dBm (600 Ω)
   Input filter: 80 kHz LPF

CH4 adjustment

2. Connect the audio analyzer's input to AUDIO OUTPUT CH4 connector.
3. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
4. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV701/AU-272(B-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)

CH3 adjustment

5. Connect the audio analyzer's input to AUDIO OUTPUT CH3 connector.
6. Play back the 400 Hz (with 25 kHz deviation) portion (14:00 to 16:30) of the alignment tape CR5-1B / CR5-1B PS.
7. Adjust the audio level on the audio analyzer.
   Adj. point: ⊘RV601/AU-272(B-1)
   Specification: +4.0 ±0.2 dBm (at 600 Ω load)


TP502
LV550
TP551
TP500
RV500
4
Board No.suffix 12
A
B
C
D
E
1
2
3
4
RV701
RV601
RV700
E700
RV600
E600
TP700
RV200
TP200
RV101
RV201
RV100
TP100
TP504
TP503
TP601
TP600
TP701
E501
E500
TP552
TP550
TP501
RV501
TP551
TP502
TP500
RV500
Board No.suffix 13 and higher

AU-272 Board (Side A)

8-5-7. CUE PB System Adjustment/CUE-13/AE-31 Boards

Note

Models to be adjusted: HDW series
DVW series
MSW-M series

Tools

- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Audio level meter:
  Hewlett-Packard HP3400A or equivalent
- Digital voltmeter: Advantest TR6845 or equivalent
- Extension board: EX-797
- Shorting clip
- Alignment tapes:

HDW series:	HR5-1A
DVW/MSW-M series (NTSC):	ZR5-1
DVW/MSW-M series (PAL):	ZR5-1P

Preparation

1. For HDW series only

Check that the operation mode is set to 59.94 Hz with the setup menu ITEM-013. If not, switch it to 59.94 Hz.

2. Check the switch settings on the APR-52/CUE-13 boards.

Reset all the settings of these boards to the factory settings. (Refer to “1. Switches Settings” in “8-5-2. Common Preparation”.)

3. Extend the CUE-13 board with an extension board EX-797.

Note

After turning off the power, then remove the CUE-13 board.

4. Open the AE-31 board.

(Refer to the figure in Section 5-1-2.)

5. Clean the AT head.

Clean the tape running surface of the AT head.
(Refer to “4-2-5. Stationary Heads Cleaning”.)

Note

Perform the cleaning under the power off.

6. Check the other settings.

Check that any setting on the panel or the menu on the VTR is well prepared for processing adjustments.
(Refer to “4. Other settings” in “8-5-2. Common Preparation”.)

7. Check the LAU PB System adjustment.

As for MSW-M series, LAU PB adjustment (Section 8-5-5) must be completed in advance.

8. Condition to be kept is:

- Warming up of equipment to be used (20 minutes or more).

1. CUE PB Level Adjustment

1. Short-circuit TP101/CUE-1(D-1) and E100/CUE-13(C-1) with a shorting clip.
2. Connect the audio level meter to TP102/CUE-13(B-2).
   GND: E103/CUE-13(C-2)
3. Play back the portion of 1 kHz, +4 dBu of the alignment tape.
4. Check level using the audio level meter, and then adjust it.
   Adjusting point: ⊘RV300/AE-31(B-4)
   Specification: −10.0 ±0.2 dBu
5. With these terminals short-circuited, follow the next step.

2. CUE Output Level Adjustment

1. Be sure that TP101/CUE-13(D-1) and E100/CUE-13 (C-1) are short-circuited.
2. Connect the audio analyzer to CUE OUT connector of the connector panel.
3. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
4. Play back the portion of 1 kHz, +4 dBu of the alignment tape.
5. Check level using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV104/CUE-13(B-1)
   Specification: +4.0 ±0.2 dBu
6. Remove the shorting clip which is attached to TP101/CUE-13(D-1) and E100/CUE-13(C-1).

3. CUE PB VCA Adjustment

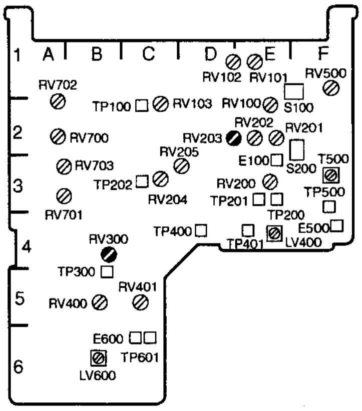
1. Connect the audio analyzer to CUE OUT connector of the connector panel.
2. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input Filter: 80 kHz LPF
3. Play back the portion of 1kHz, +4 dBu of the alignment tape.
4. Check audio level using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV102/CUE-13(D-1)
   Specification: +4.0 ±0.2 dBu

4. CUE PB Frequency Response adjustment

1. Connect the audio analyzer to CUE OUT connector of the connector panel.
2. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input Filter: 80 kHz LPF
3. Play back the portion of 90 Hz to 12 kHz of the alignment tape.
4. Check this PB level using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV203/AE-31(D-2)
   Specification: Each frequency (3 kHz, 7 kHz, 10 kHz, 12 kHz) level:
   1 kHz level ±0.8 dB
   Firstry, adjust the level of 10 kHz until it equates with the level of 1 kHz. Then check each level of other frequency.

5. CUE Meter Level Adjustment

1. Connect the digital voltmeter to TP103/CUE-13(A-2).
   GND: E103/CUE-13(C-2)
2. Play back the portion of 1 kHz, +4 dBu of the alignment tape.
3. Check the DC voltage using digital voltmeter, and then adjust it.
   Adjusting point: ⊘RV105/CUE-13(A-2)
   Specification: +1.25 ±0.01 Vdc



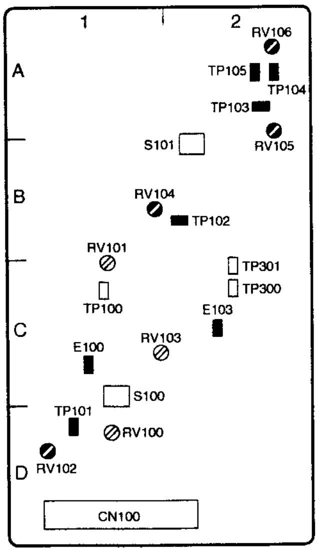
AE-31 Board (Side A)

6. CUE Meter Offset Adjustment

1. Short-circuit TP105/CUE-13(A-2) and TP104/CUE-13(A-2) with a shorting clip.
2. Insert the cassette tape or alignment tape, then the VTR will be in STANDBY OFF mode.
3. Check the indication of CUE meter of the front panel, and then adjust it.
   Adjusting point: ⊘RV106/CUE-13(A-2)
   Specification: −40 dB dots to flicker intermittently.
   Continuous lighting is NG.
4. Remove the shorting clip between TP105/CUE-13(A-2) and TP104/CUE-13(A-2).

7. For HDW-M2000P/M2100P Only

Reset the operation mode to 50 Hz with the setup menu ITEM-013.



CUE-13 Board (Side A)

8-5-8. CUE REC System Adjustment/CUE-13/AE-31 Boards

Note

Model to be adjusted: HDW recorder
DVW recorder

Tools

- Audio signal generator:
  Tektronix SG5010 or equivalent
- Audio analyzer:
  Audio Precision System One/Two or
  Tektronix AA501A-option 02 or equivalent
- Audio level meter:
  Hewlett-Packard HP3400A or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Frequency counter:
  Advantest TR5821 or equivalent
- Extension board: EX-797
- Shorting clip
- Recording tape: BCT-HD (HDCAM cassette tape)
  BCT-D (Digital Betacam cassette tape)

Preparation

1. Conditions to be kept are:

- Resetting all the switch settings of the CUE-13 board to the factory settings. (Refer to "8-5-2. Common Preparation".)
- Extension of the CUE-13 board.
- Opening of the AE-31 board.
- Cleaning the AT head.
- Check of the other settings. (Refer to "8-5-2. Common Preparation".)
- Warming up of equipment to be used (20 minutes or more).

1. CUE Input Level Adjustment

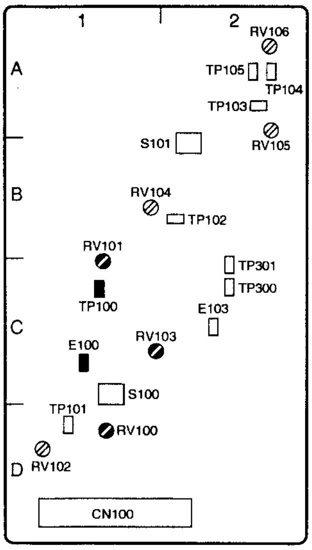
1. Short-circuit TP100/CUE-13(C-1) and E100/CUE-13(C-1) with a shorting clip.
2. Input 1 kHz +4 dBu audio signal to CUE INPUT connector of the connector panel.
3. Connect the audio analyzer to CUE OUT connector of the connector panel.
4. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
5. Check CUE level using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV100/AE-31(D-1)
   Specification: +4.0 ±0.1 dBu
6. Remove the shorting clip between TP100/CUE-13(C-1) and E100/CUE-13(C-1).

2. CUE REC VCA Adjustment

1. Input 1 kHz +4 dBu audio signal to CUE INPUT connector of the connector panel.
2. Connect the audio analyzer to CUE OUT connector of the connector panel.
3. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
4. Check the level using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV101/CUE-13(B-1)
   Specification: +4.0 ±0.1 dBu

3. CUE REC VCA Distortion Ratio Adjustment

1. Input 1 kHz +4 dBu audio signal to CUE INPUT connector of the connector panel.
2. Connect the audio analyzer to CUE OUT connecter of the connector panel.
3. Set the audio analyzer as follows:
   Measuring mode: THD+N
   Range: 2 %
   Input Filter: 80 kHz LPF
4. Check the distortion ratio using the audio analyzer, and then adjust it.
   Adjusting point: ⊘RV103/CUE-13(C-1)
   Specification: Minimize (to be 0.1 % or less)



CUE-13 Board (Side A)

4. CUE Erase Current Adjustment

1. Connect the audio level meter to TP601/AE-31(C-6).
   GND: E600/AE-31(C-6)
2. Insert the recording tape to have the VTR in the recording mode.
3. Check the level using the audio level meter, and then adjust it.
   Adjusting point: ⊘LV600/AE-31(B-6)
   Specification: 160 ±5 mVrms

5. CUE Bias Frequency Adjustment

1. Connect the frequency counter to TP500/AE-31(F-3).
   GND: E500/AE-31(F-4)
2. Insert the recording tape to have the VTR in the recording mode.
3. Check the frequency using the frequency counter, and then adjust it.
   Adjusting point: ⊘T500/AE-31(F-3)
   Specification: 160 ± 10 kHz

6. CUE Bias Trap Adjustment

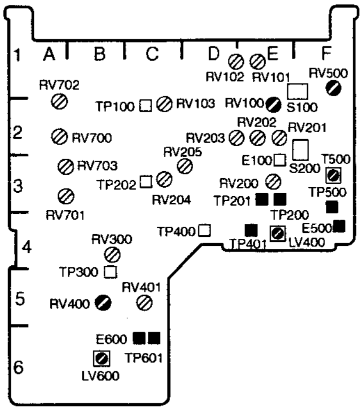
1. Disconnect a cable to the CUE INPUT connector of the connector panel if it is connected.
2. Connect the oscilloscope to TP401/AE-31(E-4).
   GND: E500/AE-31(F-4)
3. Insert the recording tape to have the VTR in the recording mode.
4. Check the level using the audio level meter, and then adjust it.
   Adjusting point: ⊘LV400/AE-31(E-4)
   Specification: Minimize

7. CUE Bias Current Adjustment

1. Ensure that nothing is connected to the CUE INPUT connector.
2. Connect the audio level meter to TP200/AE-31(E-3).
   GND: TP201/AE-31(E-3)
3. Insert the recording tape to have the VTR in the recording mode.
4. Check the level using the audio level meter, and then adjust it.
   Adjusting point: ⊘RV500/AE-31(F-1)
   Specification: 16 ±0.5 mVrms

8. CUE REC Level Adjustment

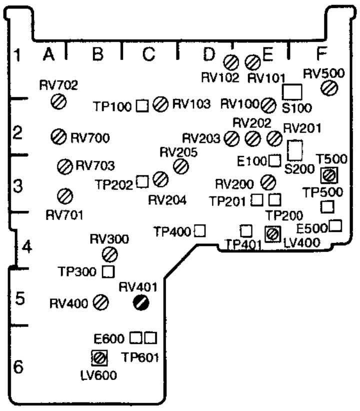
1. Input the audio signal 1 kHz +4 dBu to CUE INPUT connector of the connector panel.
2. Connect the audio analyzer to CUE OUT connector of the connector panel.
3. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
4. Insert the recording tape, then perform recording and playback.
5. Check the PB level using audio analyzer.
   If the audio level is not within the specification, adjust it in the REC mode, then check it in the PB mode again. Repeat till the level is within the specification.
   Adjusting point (REC mode): ⊘RV400/AE-31(B-5)
   Specification (PB mode): +4.0 ±0.2 dBu



AE-31 Board (Side A)

9. CUE REC Frequency Response Adjustment

1. Connect the audio analyzer to CUE OUT connector of the connector panel.
2. Set the audio analyzer as follows:
   Measuring mode: LEVEL, dBu
   Input filter: 80 kHz LPF
3. Insert the recording tape.
4. Input the audio signal −16 dBu to CUE INPUT connector of the connector panel, and then record the following frequency sequentially.
   Recording audio signal: −16 dBu
   1 kHz, 3 kHz, 7 kHz, 10 kHz, and 12 kHz
5. Play back the recorded portion, and then check the level for each frequency using the audio analyzer. If the level is not within the specification, adjust it in the REC mode while checking the level in the PB mode. Firstly adjust the level of 10 kHz until it equates with the level of 1 kHz. Then, check each of other frequency alike.
   Adjusting point (REC mode): ⊘RV401/AE-31(C-5)
   Specification (PB mode): Each frequency level
   1 kHz level ±0.9 dB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RV702
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RV100
S100
RV700
RV202
RV203
RV201
RV205
RV703
E100
S200
T500
TP202
RV200
RV204
TP201
TP500
RV701
TP200
TP400
E500
RV300
TP401
LV400
TP300
RV401
RV400
E600
TP601
LV600

AE-31 Board (Side A)

8-6. Video System Alignment (VPR-64/VPR-91 Board)

8-6-1. Adjustment Overview

When the VPR-64/91 board was replaced or repaired, perform the video system alignment.

Notes

- For HDW/MSW series (VPR-64 board):
  The video system adjustments are required in both the standard mode and the alternative mode.
  Adjust in the standard mode first, and then adjust in the alternative mode.

NTSC model:	Standard mode:	59.94 Hz or 525
	Alternative mode:	50 Hz or 625
PAL model:	Standard mode:	50 Hz or 625
	Alternative mode:	59.94 Hz or 525

- For DVW series (VPR-91 board):
  Adjust in the standard mode only.
- "NTSC model" expressed in this section means the models usually operated in 59.94 Hz/525 mode.
  And "PAL model" means the models usually operated in 50 Hz/625 mode.
- In the video system alignment, be sure to adjust without the extension board.
- As for the video system of the analog Betacam PB, refer to Section 8-7.

The adjustments are performed using the menu of the maintenance mode.
As for detail of each menu in the maintenance mode, refer to Section 3.

Tools

The following equipment (or equivalent) and fixtures are required:

Note

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 30 minutes or more.

Analog composite video signal generator (Sign is SG1.)	Tektronix TSG-130A	For 59.94 Hz or 525 mode
	Tektronix TSG-131A	For 50 Hz or 625 mode
Analog composite video signal generator (Sign is SG2.)	Tektronix 1410	For 59.94 Hz or 525 mode
	Tektronix 1411	For 50 Hz or 625 mode
Analog composite waveform/vector monitor	Tektronix 1750A	For 59.94 Hz or 525 mode
	Tektronix 1751A	For 50 Hz or 625 mode
Oscilloscope	Tektronix TDS460A	
Analog component waveform monitor	Tektronix WFM300A	
Serial component waveform monitor **Note** When the serial component waveform monitor is not available, use the analog component waveform monitor above instead.	Tektronix WFM601	
Frequency counter	Advantest TR5821	
Analog composite video monitor (NTSC/PAL switchable type) **Note** Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.		
75 Ω terminators (3 pieces)		
75 Ω BNC T adapter		

Adjustments

Section	Item	Adjustment point	Remarks
8-6-2	Preparation in standard mode		
8-6-3	Composite video output level adjustment (Standard Mode)		
		A20 : VPR VR : VIDEO OUT LEVEL	VIDEO OUTPUT COMPOSITE
	Data saving	A2F : NV-RAM CONTROL	
8-6-4	Component video output (D1) adjustment (Standard Mode)		
	Y	A20 : VPR VR : Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT Y
	R-Y	A20 : VPR VR : R-Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT R-Y
	B-Y	A20 : VPR VR : B-Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT B-Y
	Data saving	A2F : NV-RAM CONTROL	
	Output phase check		VIDEO OUTPUT COMPONENT
8-6-5	Component video output (Betacam) level adjustment (for 59.94 Hz/525 Mode Only)		
	R-Y	A20 : VPR VR : B-CAM R-Y OUT LEVEL	VIDEO OUTPUT COMPONENT R-Y
	B-Y	A20 : VPR VR : B-CAM B-Y OUT LEVEL	VIDEO OUTPUT COMPONENT B-Y
	Data saving	A2F : NV-RAM CONTROL	
8-6-6	Reference color frame pulse check (Standard Mode)		If the specification is not satisfied, change the adjustment data.
		A20 : VPR VR : REF 1st FLD DET	TP1201/VPR-64, VPR-91
	Data saving	A2F : NV-RAM CONTROL	
8-6-7	Internal 4fsc frequency adjustment (Standard Mode)		
		A20 : VPR VR : INT 4FSC FREQ	TP1200/VPR-64, VPR-91
	Data saving	A2F : NV-RAM CONTROL	
8-6-8	Composite video input adjustment (Standard Mode) (for DVW/MSW recorder Only)		
	Pedestal level	A25 : DEC VR : VIDEO PEDESTAL	VIDEO OUTPUT COMPOSITE 2
	Gain (MANUAL)	A25 : DEC VR : VIDEO GAIN	
	Gain (AGC)	A25 : DEC VR : AGC VIDEO GAIN	
	Color frame detect	A24 : INPUT CF DETECT	(Automatic adjustment)
	Data saving	A2F : NV-RAM CONTROL	
8-6-9	Component video input adjustment (Standard Mode) (for DVW/MSW recorder Only)		
	Input level	A22 : AD VR(LOOP): Y INPUT LEVEL A22 : AD VR(LOOP): R-Y INPUT LEVEL A22 : AD VR(LOOP): B-Y INPUT LEVEL	SDI OUTPUT 1 or VIDEO OUTPUT COMPONENT
	Input phase	A22 : AD VR(LOOP): Y INPUT PHASE A22 : AD VR(LOOP): Y/B-Y INPUT DELAY A22 : AD VR(LOOP): Y/R-Y INPUT DELAY	
	Betacam Input level	A22 : AD VR(LOOP): B-CAM Y IN LEVEL A22 : AD VR(LOOP): B-CAM R-Y IN LEVEL A22 : AD VR(LOOP): B-CAM B-Y IN LEVEL	
	Data saving	A2F : NV-RAM CONTROL	

Continue

Continued

Items listed below are required for HDW/MSW series (VPR-64 board) only.
They are not required for DVW series (VPR-91board).

Section	Item	Adjustment point	Remarks
8-6-10	Preparation in alternative mode		
8-6-11	Composite video output level adjustment (Alternative Mode)		
		A20 : VPR VR : VIDEO OUT LEVEL	VIDEO OUTPUT COMPOSITE
	Data saving	A2F : NV-RAM CONTROL	
8-6-12	Component video output (D1) adjustment (Alternative Mode)		
	Y	A20 : VPR VR : Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT Y
	R-Y	A20 : VPR VR : R-Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT R-Y
	B-Y	A20 : VPR VR : B-Y OUTPUT LEVEL	VIDEO OUTPUT COMPONENT B-Y
	Data saving	A2F : NV-RAM CONTROL	
8-6-13	Component video output (Betacam) adjustment (for PAL Model Only in 59.94 Hz/525 Mode)		
	R-Y	A20 : VPR VR : B-CAM R-Y OUT LEVEL	VIDEO OUTPUT COMPONENT R-Y
	B-Y	A20 : VPR VR : B-CAM B-Y OUT LEVEL	VIDEO OUTPUT COMPONENT B-Y
	Data saving	A2F : NV-RAM CONTROL	
8-6-14	Reference color frame pulse check (Alternative Mode)		If the specification is not satisfied, change the adjustment data.
		A20 : VPR VR : REF 1st FLD DET	TP1201/VPR-64
	Data saving	A2F : NV-RAM CONTROL	
8-6-15	Internal 4fsc frequency adjustment (Alternative Mode)		
		A20 : VPR VR : INT 4FSC FREQ	TP1200/VPR-64
	Data saving	A2F : NV-RAM CONTROL	
8-6-16	Composite video input adjustment (Alternative Mode) (for MSW recorder Only)		
	Pedestal level	A25 : DEC VR : VIDEO PEDESTAL	VIDEO OUTPUT COMPOSITE 2
	Gain (MANUAL)	A25 : DEC VR : VIDEO GAIN	
	Gain (AGC)	A25 : DEC VR : AGC VIDEO GAIN	
	Color frame detect	A24 : INPUT CF DETECT	(Automatic adjustment)
	Data saving	A2F : NV-RAM CONTROL	
8-6-17	Component video input adjustment (Alternative Mode) (for MSW recorder Only)		
	Input level	A22 : AD VR(LOOP): Y INPUT LEVEL A22 : AD VR(LOOP): R-Y INPUT LEVEL A22 : AD VR(LOOP): B-Y INPUT LEVEL	SDI OUTPUT 1 or VIDEO OUTPUT COMPONENT
	Input phase	A22 : AD VR(LOOP): Y INPUT PHASE A22 : AD VR(LOOP): Y/B-Y INPUT DELAY A22 : AD VR(LOOP): Y/R-Y INPUT DELAY	
	Betacam Input level	A22 : AD VR(LOOP): B-CAM Y IN LEVEL A22 : AD VR(LOOP): B-CAM R-Y IN LEVEL A22 : AD VR(LOOP): B-CAM B-Y IN LEVEL	
	Data saving	A2F : NV-RAM CONTROL	
8-6-18	Perfection in video system alignment		

8-6-2. Preparation in Standard Mode

1. Turn the power off.
2. **For DVW/MSW series:**
   Carry out the following setting to enable the operation of the setup extended menu.
   S1502(B-1/SS-89 board), Bit 1 ⇨ ON (Upper side)
   (Customer setting of S1501-1 : ☐ ON ☐ OFF)
   (This switch is set to ON at the factory setting for HDW series.)
3. If the VPR-64/91 board is extended with an extension board, reattach the VPR-64/91 board without the extension board.
4. Turn the power on.
5. Set the VTR's switches and function menus as follows:

   Note

   Reset the settings to the customer settings after completing the video system adjustment.

Location	Item		Customer setting		Setting at adjustment
Function menu	HOME1	F1 (VID. IN)[*1]	____________	⇨	COMPST
		F2 (PB/EE)[*1]	____________	⇨	EE
	Page2	F1 (V. PROC)	____________	⇨	LOCAL
		F2 (VIDEO)	____________	⇨	PRESET
		F3 (CHROMA)	____________	⇨	PRESET
		F4 (HUE/C PHAS)[*2]	____________	⇨	PRESET
		F5 (SETUP/BLACK)	____________	⇨	PRESET
		F6 (YC DLY)[*2]	____________	⇨	PRESET
	Page4	F4 (CHARA)	____________	⇨	ON
Connector panel	75 Ω switch	REF. VIDEO/INPUT	____________	⇨	ON (Right side)
		COMPOSITE[*1]	____________	⇨	ON (Right side)

[*1] DVW/MSW recorder only
[*2] Not for HDW-2000/D2000, DVW-2000/P and MSW-2000

6. **For the NTSC model only:**
   Set the ITEM-709 and -713 in the setup extended menu as follows:

   Notes

   - After completing the video system adjustment in the standard mode, be sure to reset them to the customer settings.
   - The following items are selectable only in 59.94 Hz or 525 mode.
   - "NTSC model" means the models usually operated in 59.94 Hz or 525 mode as the standard mode.

ITEM No.	SUB-ITEM	Customer setting	Setting at adjustment
709 : CAV LEVEL FORMAT	0*1. INPUT CAV LEVEL		⇨ B-CAM
	1. OUTPUT CAV LEVEL		⇨ B-CAM
713 : VIDEO SETUP REFERENCE LEVEL	0*1. MASTER LEVEL		⇨ 0.0%
	1*1. INPUT LEVEL		⇨ MSTER
	2*1. VBLK REMOVE CNT		⇨ REMOV
	3*2. BETACAM PB LEVEL		⇨ MSTER
	4. OUTPUT LEVEL		⇨ MSTER

*1: DVW/MSW recorder only
*2: Not for HDW-2000/D2000, DVW-2000/P and MSW-2000

7. **For HDW/MSW series:**
   Check that the setup extended menu is set as follows: (Refer to the operation manual.)

Model	Setup menu		Setting
HDW series	ITEM-013	NTSC model	⇨ 59.94 Hz
		PAL model	⇨ 50 Hz
	ITEM-930 (CONVERTER MODE)		⇨ SQUEEZE
MSW series	ITEM-013	NTSC model	⇨ 525 mode
		PAL model	⇨ 625 mode

8. Set the following mode of the analog composite monitor.
   For NTSC model: NTSC
   For PAL model: PAL

8-6-3. Composite Video Output Adjustment (Standard Mode)

Note

For HDW/MSW series:

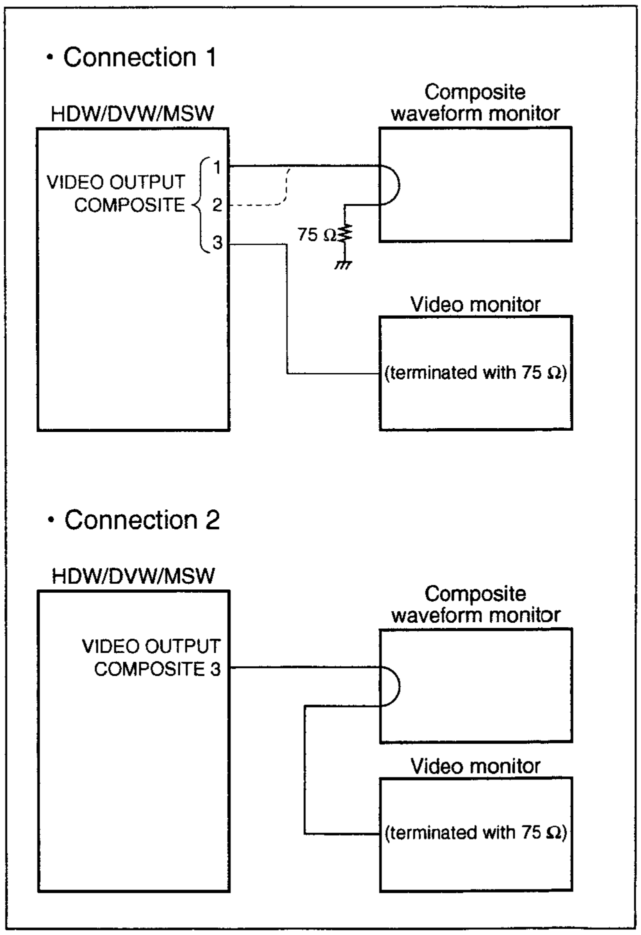
For the composite video output adjustment in the alternative mode, refer to Section 8-6-11.

Tools

- Analog composite waveform monitor
  For NTSC model:
  Tektronix 1750A, or equivalent
  For PAL model:
  Tektronix 1751A, or equivalent
- Analog composite video monitor
  Note
  Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
- 75 Ω terminator

Preparation

1. Connect the analog composite waveform monitor as shown Connection 1 on Figure "Connections".


• Connection 1
HDW/DVW/MSW
Composite waveform monitor
VIDEO OUTPUT COMPOSITE
1
2
3
75 Ω
Video monitor
(terminated with 75 Ω)
• Connection 2
HDW/DVW/MSW
Composite waveform monitor
VIDEO OUTPUT COMPOSITE 3
Video monitor
(terminated with 75 Ω)

Connections

2. Check the settings for adjustment.

Refer to "8-6-2. Preparation in Standard Mode".

3. Check the equipment has warmed up.

Before starting the adjustment, warm up the VTR and equipment through the power for 30 minutes or more.

Output Level Adjustment

1. Enter the maintenance mode.
2. Enter the C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C21 : VIDEO TEST SG
3. Select the following test signal:
   NTSC model: 75% Color Bars
   PAL model: 100% Color Bars
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.
5. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR

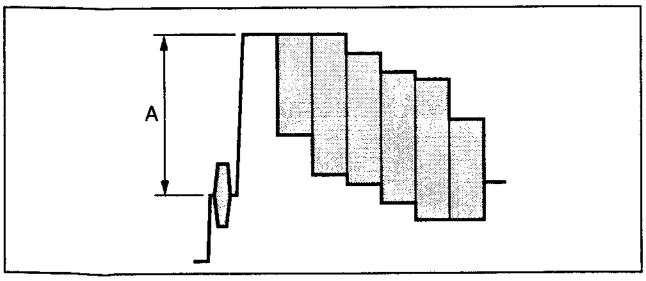
Check (Adjustment)

6. Connect the analog composite waveform monitor to each VIDEO OUTPUT COMPOSITE connector, then check the white peak level. If it is not within the specification, adjust it.

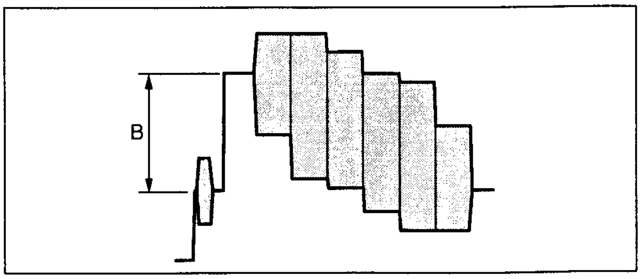
   Notes

   - The outputs of VIDEO OUTPUT COMPOSITE 1, 2 and 3 connectors cannot be adjusted separately.
   - When checking/adjusting the output of VIDEO OUTPUT COMPOSITE 3 (SUPER) connector, change the connection of the video monitor as Connection 2 on the previous page.
   - The menu picture of the maintenance mode is superimposed in the output of VIDEO OUTPUT COMPOSITE 3 (SUPER) connector. If the superimposed picture obstructs, set the F4 (CHARA) of function menu Page4 to OFF. (Be sure to reset it to ON after checking/adjusting.)

Output channel	[Connection]	Adjustment point (A20 : VPR VR)	Specification NTSC model	Specification PAL model
COMPOSITE 1 or 2	[Connection 1]	VIDEO OUT LEVEL	A = 100 ±1 IRE	B = 700 ±7 mV
COMPOSITE 3	[Connection 2]		(A = 714 ±7 mV)	



NTSC model



PAL model

7. To exit A20 : VPR VR, press the F6 (EXIT) button once.

Saving the Data

When the adjustment is not performed in step 6, skip over to step 9.

8. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.

8-6-4. Component Video Output (D1) Adjustment (Standard Mode)

Note

For HDW/MSW series:

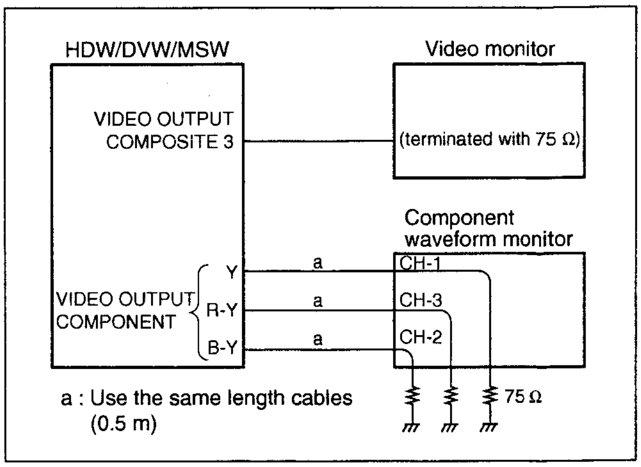
For the composite video output adjustment in the alternative mode, refer to Section 8-6-12.

Tools

- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- 75 Ω terminators (3 pieces)

Preparation

1. Connect the analog component waveform monitor.


HDW/DVW/MSW
Video monitor
VIDEO OUTPUT
COMPOSITE 3
(terminated with 75 Ω)
Component
waveform monitor
Y
VIDEO OUTPUT
COMPONENT
R-Y
B-Y
a
a
a
CH-1
CH-3
CH-2
75 Ω
a : Use the same length cables
(0.5 m)

Connection

2. Change the setup extended menu setting. (NTSC model only)

ITEM-709 : CAV LEVEL FORMAT
1. OUTPUT CAV LEVEL ⇨ D-1

3. Conditions to be kept are:

- Settings for adjustment (Refer to Section 8-6-2.) excepting the setting change of ITEM-709 in step 2.
- Warming up of equipment to be used (30 minutes or more).

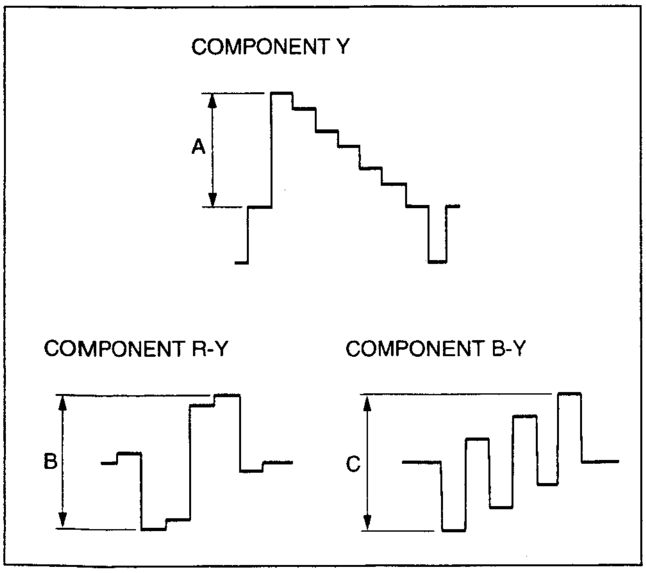
1. Output Level Adjustment

1. Enter the maintenance mode.
2. Enter the C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C21 : VIDEO TEST SG
3. Select the test signal "100% Color Bars".
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.
5. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR

Check (Adjustment)

6. Check each specified part's level of VIDEO OUTPUT COMPONENT outputs on the waveform monitor.
   If it is not within the specification, adjust it.

Output	Adj. point (A20 : VPR VR)	Specification
Y	Y OUTPUT LEVEL	A = 700 ±7 mV
R-Y	R-Y OUTPUT LEVEL	B = 700 ±7 mV p-p
B-Y	B-Y OUTPUT LEVEL	C = 700 ±7 mV p-p



7. To exit A20 : VPR VR, press the F6 (EXIT) button once.

Saving the Data

When the adjustment was not performed in step 6, skip over step 8.

8. Enter A02F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

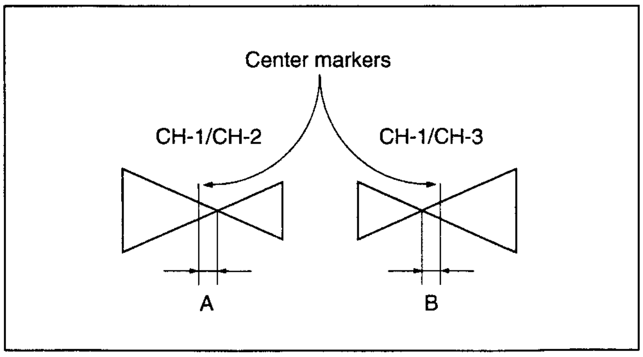
   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. To exit M1 : ADJUST, press the F6 (EXIT) button three times.

2. Output Phase Check

1. Enter the C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C21 : VIDEO TEST SG
2. Select the test signal "Bowtie".
3. Set the analog component waveform monitor to the BOWTIE mode.
4. Check the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Specifications: A = 0 ± 10 ns
   B = 0 ± 10 ns



5. Exit the maintenance mode.

8-6-5. Component Video Output (Betacam) Adjustment (59.94 Hz or 525 Mode Only)

Notes

For HDW/MSW series:

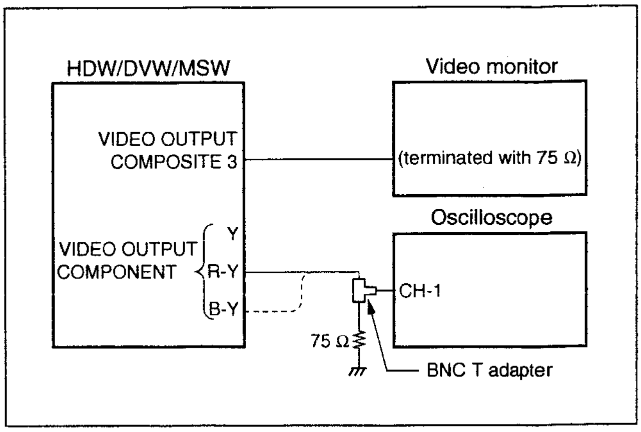
- As for the NTSC model, ensure that the operation mode is as follows:
  MSW series: 525 mode
  HDW series: 59.94 Hz mode
- As for the PAL model, be sure to complete the adjustment of "8-6-12. Component Video Output (D1) Adjustment (Alternative Mode)" before this adjustment.

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Analog composite video monitor
- 75 Ω terminator
- 75 Ω BNC T adapter

Preparation

1. Connect the oscilloscope.


HDW/DVW/MSW
VIDEO OUTPUT COMPOSITE 3
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
Video monitor
(terminated with 75 Ω)
Oscilloscope
CH-1
75 Ω
BNC T adapter

Connection

2. Change the setup extended menu setting.

ITEM-709 : CAV LEVEL FORMAT
1. OUTPUT CAV LEVEL ⇨ B-CAM

3. Conditions to be kept are:

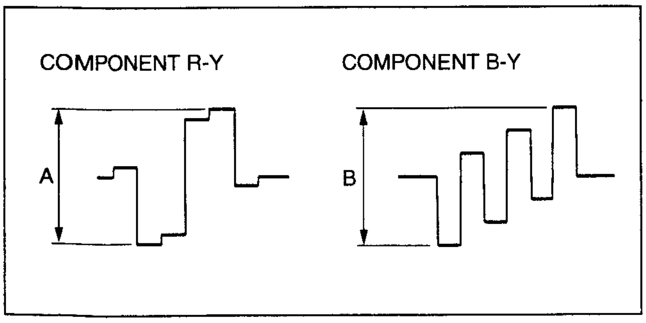
- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

Output Level Adjustment

1. Enter the maintenance mode.
2. Enter the C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/ VIDEO → C21 : VIDEO TEST SG
3. Select the test signal "75% Color Bars".
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.
5. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A20 : VPR VR

Check (Adjustment)

6. Set the oscilloscope as follows:
   Band width limit: ON (20 MHz)
   CH-1: DC 100 mV/DIV
   TIME: 10 µs/DIV
   TRIG: CH-1
7. Connect the oscilloscope's CH-1 input to VIDEO OUTPUT COMPONENT R-Y connector, then check the output level.
   If it is not within the specification, adjust it.
   Adj. point: A20 : VPR VR : R-Y OUTPUT LEVEL
   Specification: A = 757 ±7 mV p-p
8. Connect the oscilloscope's CH-1 input to VIDEO OUTPUT COMPONENT B-Y connector, then check the output level.
   If it is not within the specification, adjust it.
   Adj. point: A20 : VPR VR : B-Y OUTPUT LEVEL
   Specification: B = 757 ±7 mV p-p



9. To exit A20 : VPR VR, press the F6 (EXIT) button once.

Saving the Data

When the adjustment was not performed in both steps 7 and 8, skip over to step 11.

10. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

Note

To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

11. Exit the maintenance mode.

8-6-6. Reference Color Frame Pulse Check (Standard Mode)

Note

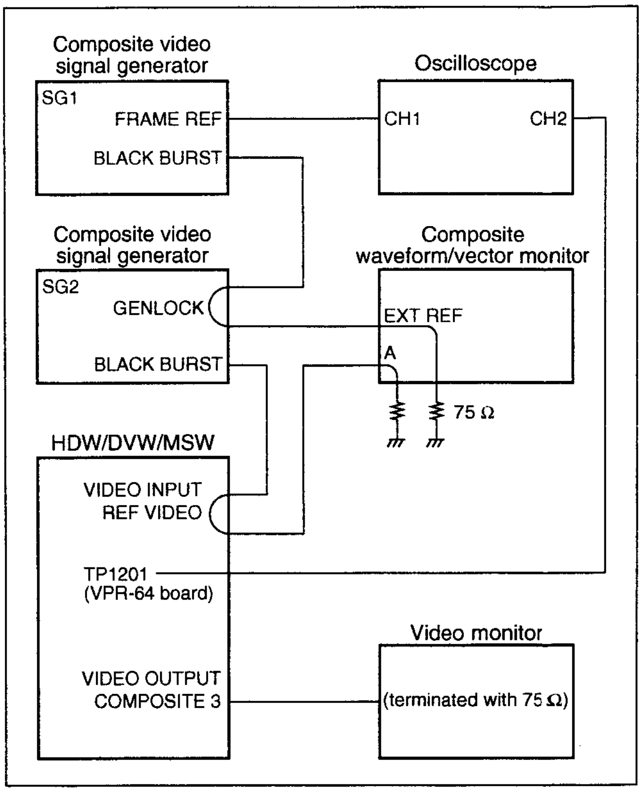
For HDW/MSW series:
For the reference color frame pulse check in the alternative mode, refer to Section 8-6-14.

Tools

- Analog composite video signal generator (SG1)
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog composite video signal generator (SG2)
  For NTSC model:
  Tektronix 1410 or equivalent
  For PAL model:
  Tektronix 1411 or equivalent
- Analog composite waveform/vector monitor
  For NTSC model:
  Tektronix 1750A, or equivalent
  For PAL model:
  Tektronix 1751A, or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Analog composite video monitor
- 75 Ω terminators (2 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
SG1
FRAME REF
BLACK BURST
Oscilloscope
CH1
CH2
Composite video signal generator
SG2
GENLOCK
BLACK BURST
Composite waveform/vector monitor
EXT REF
A
75 Ω
HDW/DVW/MSW
VIDEO INPUT
REF VIDEO
TP1201
(VPR-64 board)
VIDEO OUTPUT
COMPOSITE 3
Video monitor
(terminated with 75 Ω)

Connection

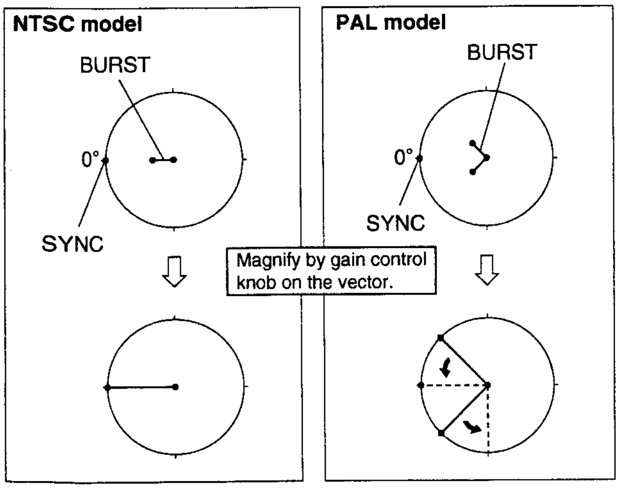
2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

1. Setting of Composite Waveform/Vector Monitor

In this section, the analog composite waveform/vector monitor is abbreviated "vector" for short.

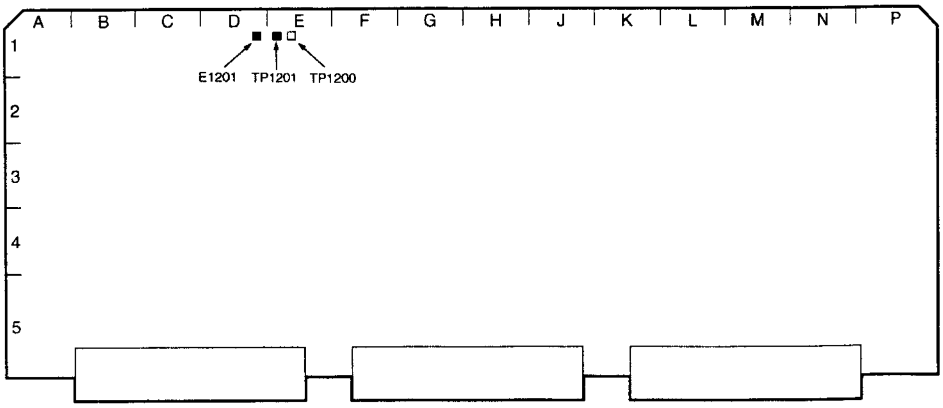
1. Set the vector as follows:
   SCH mode
   INPUT: CH-A
   EXT REF
2. Align the SYNC phase to 0 degree using the vector's PHASE knob so that the beam spot (SYNC) moves in the shortest route. (Refer to below figure.)
3. Align the BURST to regular potion on the vector using the signal generator SG2's SC PHASE knob.
4. Align the BURST's beam spot(s) to the circle scale on the vector using the gain control (knob) on the vector.
5. **For PAL model only**
   Align the BURST to the specified positions as the dotted lines of right figure using the vector's PHASE knob.



Magnify by gain control knob on the vector.

2. Reference Color Frame Pulse Check

1. Enter the maintenance mode.
2. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR
3. Connect and set the oscilloscope as follows:
   ALT display mode
   CH-2: TP1201/VPR-64, VPR-91(E-1), DC 2 V/DIV
   GND: E1201/VPR-64, VPR-91(D-1)
   TIME: 10 ms/DIV for NTSC model
   20 ms/DIV for PAL model
   TRIG: CH-1: DC 2 V/DIV
   (Connected SG1's FRAME REF output)



VPR-64/91 Board (Side A)

4. Turn the signal generator SG2's SC PHASE control knob clockwise (↻) slowly until the waveform of the oscilloscope's CH-2 (TP1201) changes from ⓐ to ⓑ.
5. Measure the BURST phase (angle A) on the vector when just inverted the phase of CH-2 (TP1201) on the oscilloscope.
6. To return the position of the BURST signal to be displayed on the vector, turn SG2's SC PHASE control knob counterclockwise (↺).
7. Turn the signal generator SG2's SC PHASE control knob counterclockwise (↺) slowly until the waveform of the oscilloscope's CH-2 (TP1201) changes from ⓐ to ⓑ.
8. Measure the BURST phase (angle B) on the vector when just inverted the phase of CH-2 (TP1201) on the oscilloscope.
9. To return the position of the BURST signal to be displayed on the vector, turn SG2's SC PHASE control knob clockwise (↻).
10. Check to see that the difference between the angles A and B is within specification.
    If it is not, perform the following steps (1) through (2).
    Specification: $A - B = 0 \pm 10°$
11. To exit the A20 : VPR VR, press the F6 (EXIT) button once.

If the result of step 10 is not within the specifications, perform the following steps (1) and (2).

(1) Add/subtract 1 to/from the data value of "REF 1st FLD DET" in the A20 : VPR VR.

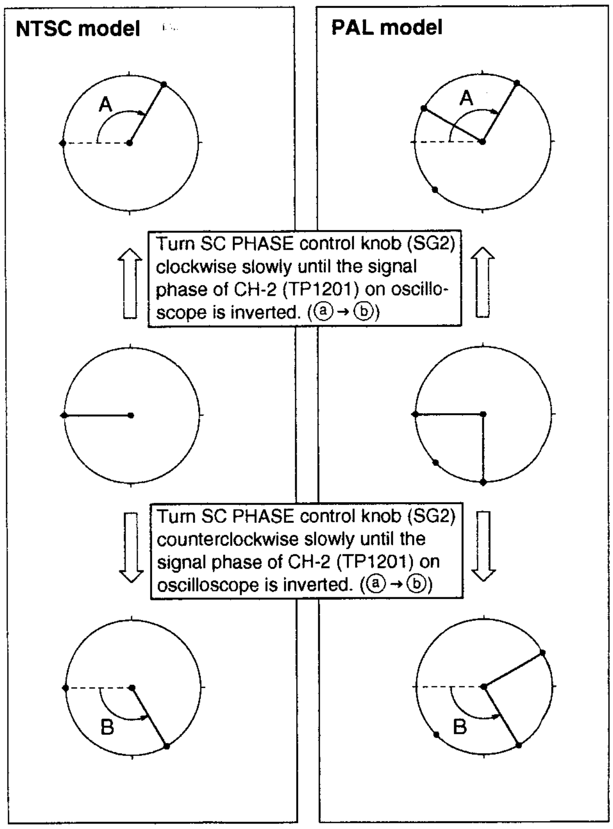
Note

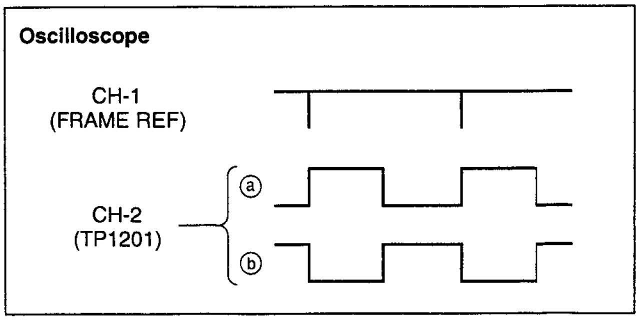
The data increase/decrease depends on the angles A and B measured in steps 5 and 8.

A > B : Subtract 1 from the data value.

A < B : Add 1 to the data value.

(2) Return to step 4.


NTSC model
PAL model
A
A
Turn SC PHASE control knob (SG2) clockwise slowly until the signal phase of CH-2 (TP1201) on oscilloscope is inverted. (ⓐ→ⓑ)
Turn SC PHASE control knob (SG2) counterclockwise slowly until the signal phase of CH-2 (TP1201) on oscilloscope is inverted. (ⓐ→ⓑ)
B
B


Oscilloscope
CH-1
(FRAME REF)
CH-2
(TP1201)
ⓐ
ⓑ

Saving the Data

Perform the following step 12 when the data of "REF 1st FLD DET" in A20 : VPR VR was changed.

12. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

    Note

    To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

13. Exit the maintenance mode.

8-6-7. Internal 4fsc Frequency Adjustment (Standard Mode)

Note

For HDW/MSW series:

For the internal 4fsc frequency adjustment in the alternative mode, refer to Section 8-6-15.

Tools

- Frequency counter:
  Advantest TR5821 or equivalent
- Analog composite video monitor

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

Frequency Adjustment

1. Supply no signal to REF. VIDEO INPUT connectors, or disconnect cables to them.
2. Connect the frequency counter to TP1200(E-1) on the VPR-64/91 board. GND: E1201/VPR-64(D-1)
3. Enter the maintenance mode.
4. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR
5. Adjust the frequency on the frequency counter.
   Adj. point: A20 : VPR VR : INT 4FSC FREQ
   Specification: 14,318,181 ±50 Hz for NTSC model
   17,734,476 ±50 Hz for PAL model
6. To exit A20 : VPR VR, press the F6 (EXIT) button once.

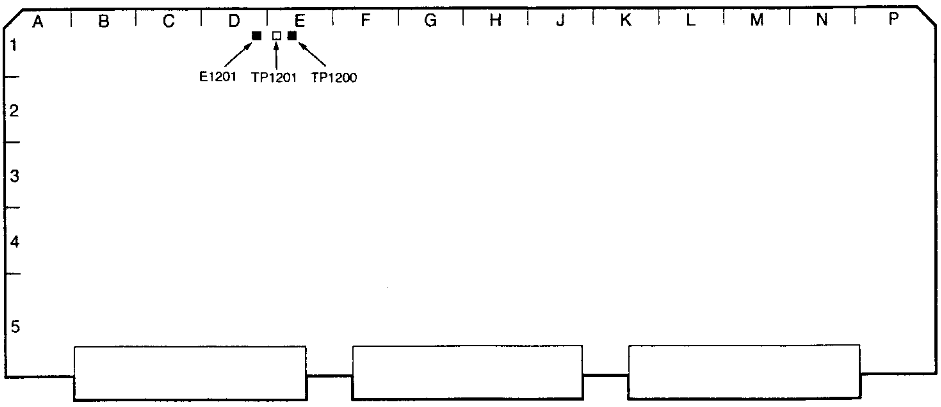
Saving the Data

7. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

8. Exit the maintenance mode.



VPR-64 Board (Side A)

8-6-8. Composite Video Input Adjustment (Standard Mode, DVW/MSW Recorder Only)

Notes

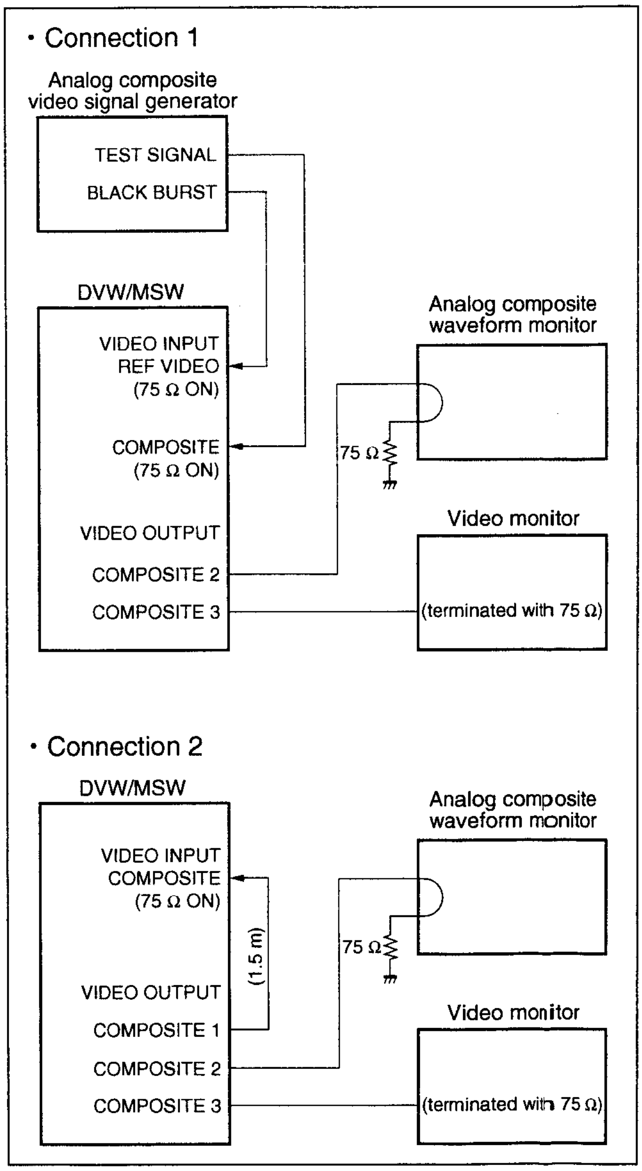
- Models to be adjusted: DVW recorder
  MSW recorder
- For MSW series:
  For the composite video input adjustment in the alternative mode, refer to Section 8-6-16.

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A, or equivalent
  For PAL model:
  Tektronix TSG-131A, or equivalent
- Analog composite waveform monitor
  For NTSC model:
  Tektronix 1750A, or equivalent
  For PAL model:
  Tektronix 1751A, or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Analog composite video monitor
- 75 Ω terminator

Preparation

1. Connect the equipment as shown Connection 1 on Figure "Connections".


• Connection 1
Analog composite video signal generator
TEST SIGNAL
BLACK BURST
DVW/MSW
VIDEO INPUT
REF VIDEO
(75 Ω ON)
COMPOSITE
(75 Ω ON)
VIDEO OUTPUT
COMPOSITE 2
COMPOSITE 3
Analog composite waveform monitor
75 Ω
Video monitor
(terminated with 75 Ω)
• Connection 2
DVW/MSW
VIDEO INPUT
COMPOSITE
(75 Ω ON)
(1.5 m)
VIDEO OUTPUT
COMPOSITE 1
COMPOSITE 2
COMPOSITE 3
Analog composite waveform monitor
75 Ω
Video monitor
(terminated with 75 Ω)

Connections

2. Conditions to be kept are:

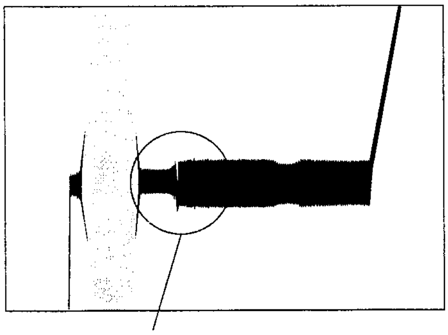
- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

1. Pedestal Level Adjustment

1. Enter the maintenance mode.
2. Enter A25 : DEC VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A25 : DEC VR
3. Input the ramp signal from the signal generator.
4. Watch the burst signal portion of VIDEO OUTPUT COMPOSITE 2 output with the waveform monitor.
   - Settings of waveform monitor
     SWEEP: 1 H, MAG
     GAIN: ×5
     UNCAL: MAX
5. Adjust the pedestal level.
   Adj. point: A25 : DECVR: VIDEO PEDESTAL
   Specification: See the figure below.
6. To exit M1 : ADJUST, press the F6 (EXIT) button three times.

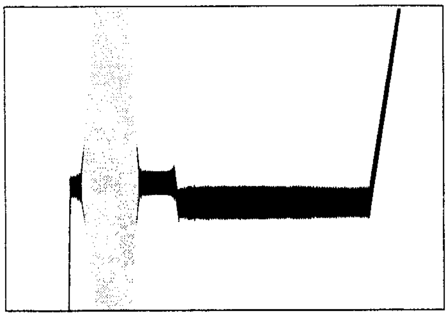
VIDEO OUTPUT COMPOSITE 2

OK



Spec.: Difference of pedestal portion is not recognized.

NG



2. Gain Adjustment (MANUAL/AGC)

1. Connect equipment as connection 2 on page 8-57.
2. Enter the C22 : MULTI LOOP (10 TIMES).
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C22 : MULTI LOOP (10 TIMES)
3. Select "100% Color Bars" as test signal.
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.

MANUAL

5. Enter A25 : DEC VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A25 : DEC VR
6. Select "VIDEO GAIN".
7. Adjust so that the specification is satisfied.
   Adj. point: A25 : DEC VR: VIDEO GAIN
   Specification: See the figure 1.

AGC

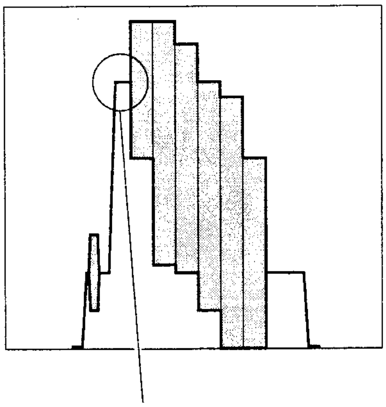
8. Select "AGC VIDEO GAIN".
9. Adjust so that the specification is satisfied.
   Adj. point: A25 : DEC VR: AGC VIDEO GAIN
   Specification: See the figure 1.
10. To exit A25 : DEC VR, press the F6 (EXIT) button once.

3. Pedestal Level Check

1. Reconnect equipment as connection 1 on page 8-57.
2. Input the ramp signal from the signal generator.
3. Watch the burst signal portion of VIDEO OUTPUT COMPOSITE 2 output with the waveform monitor.
   - Setting of waveform monitor
     SWEEP: 1 H, MAG
     GAIN: ×5
     UNCAL: MAX
4. Check to see that the pedestal portion is within the specification.
   If not, perform "1. Pedestal Level Adjustment" again.
   Specification: See the figure 2.

VIDEO OUTPUT COMPOSITE 2

OK



Spec.: The white level of the signal after looping overlaps on the white level of the 1st signal.

Note

The signal after looping is displayed in a state of overlapping on 1st signal on the screen of the waveform monitor.
They appear that the 1st signal is freezing and the signal after looping is changing the fluctuation level.

NG

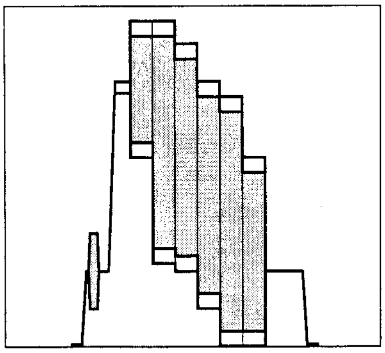
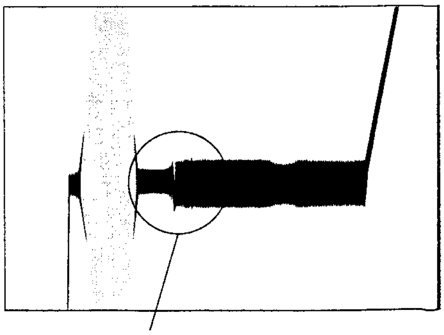


Figure 1. Gain Adjustment

VIDEO OUTPUT COMPOSITE 2

OK



Spec.: Difference of pedestal portion is not recognized.

Figure 2. Pedestal Level Check

4. Color Frame Detection Adjustment

Note

Ensure that the video output SCH from the signal generator is within 0 ±5°.

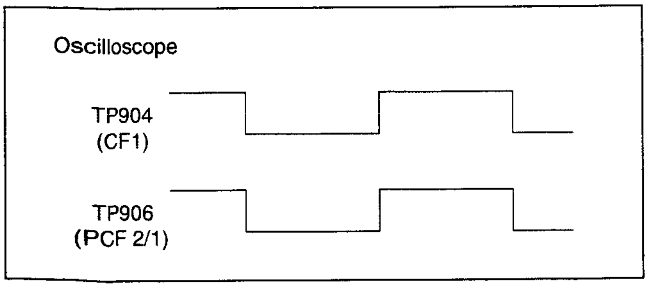
1. Input the ramp signal from the signal generator.
2. Enter A24 : INPUT CF DETECT.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A24 : INPUT CF DETECT

   Note

   In this time, "Manual" is displayed on the video monitor because the unit is in the manual adjustment mode.
3. Change the mode to the automatic adjustment mode.

   Note

   To change the adjustment mode from "Manual" to "Auto":
   When there is the *-mark to ahead of "Manual", turn the MULTI CONTROL knob clockwise (↻) while pressing the HOME button.
   Then "Auto (Push SET button)" will be displayed.
4. To execute the automatic adjustment, press the F5 (SET) button once.
   - The displayed message on the video monitor will change to "Auto Adjusting ...". The displayed data value will also change.
5. Confirm the automatic adjustment completion on the video monitor.
   - Message "Auto Adjust Complete" will be displayed when the automatic adjustment is completed.
6. Connect and set the oscilloscope as follows:
   CH-1: TP904/VPR-64, VPR-91(G-1) , DC 500 mV/DIV
   GND: E1201/VPR-64, VPR-91(D-1)
   CH-2: TP906/VPR-64, VPR-91(F-1) , DC 500 mV/DIV
   GND: E1201/VPR-64, VPR-91(D-1)
   TIME: 10 ms/DIV
7. Check that the two waveforms (TP904 and TP906) are the same phase.



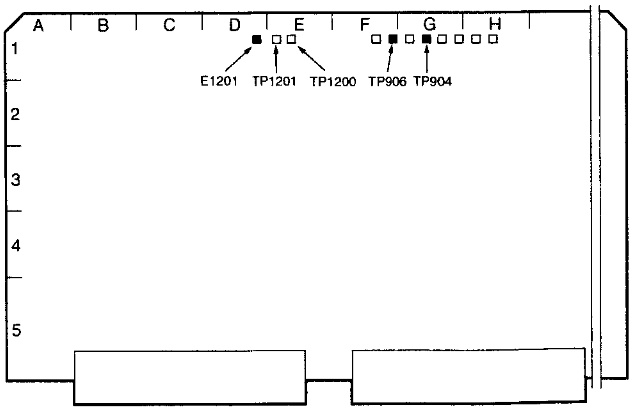
8. To exit A24 : INPUT CF DETECT, press the F6 (EXIT) button once.

5. Saving the Data

1. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".
2. Exit the maintenance mode.



VPR-64/91 Board (Side A)

8-6-9. Component Video Input Adjustment (Standard Mode, DVW/MSW Recorder Only)

Notes

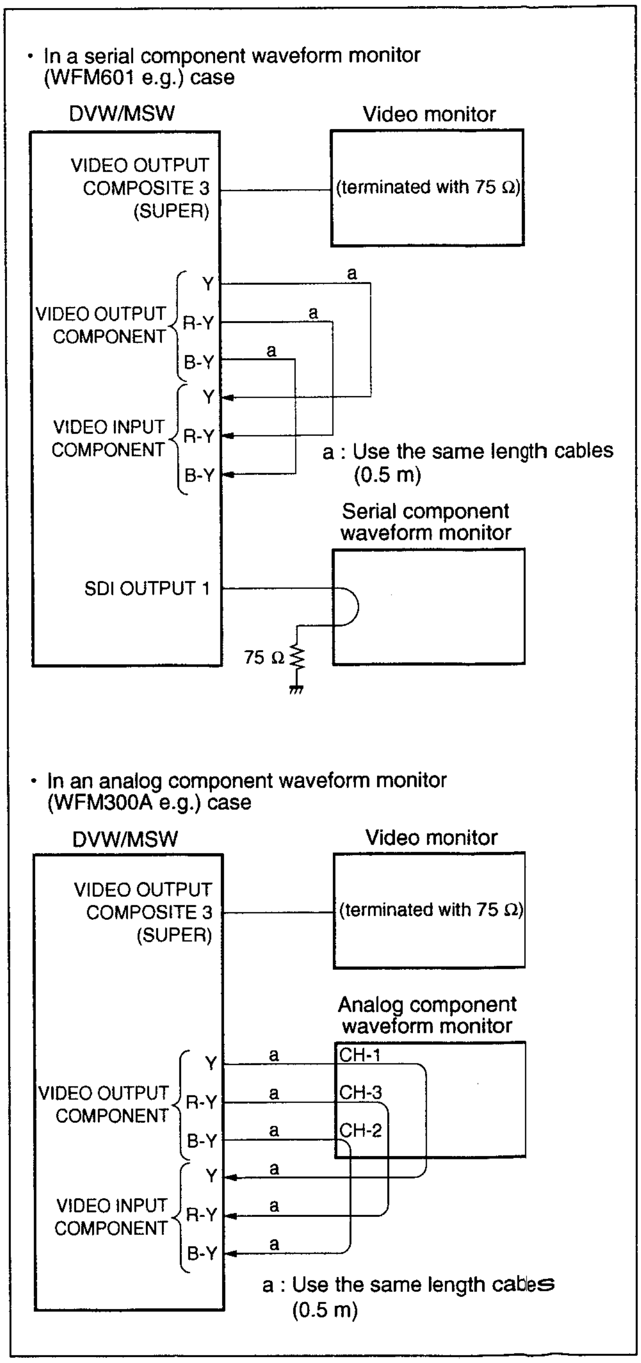
- Models to be adjusted: DVW recorder
  MSW recorder
- For MSW series:
  For the component video input adjustment in the alternative mode, refer to Section 8-6-17.

Tools

- Component waveform monitor:
  Tektronix WFM300A, WFM601, or equivalent
- Analog composite video monitor
- 75 Ω terminator

Preparation

1. Connect the equipment.


• In a serial component waveform monitor (WFM601 e.g.) case
DVW/MSW
Video monitor
VIDEO OUTPUT COMPOSITE 3 (SUPER)
(terminated with 75 Ω)
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
VIDEO INPUT COMPONENT
Y
R-Y
B-Y
a
a
a
a : Use the same length cables (0.5 m)
Serial component waveform monitor
SDI OUTPUT 1
75 Ω
• In an analog component waveform monitor (WFM300A e.g.) case
DVW/MSW
Video monitor
VIDEO OUTPUT COMPOSITE 3 (SUPER)
(terminated with 75 Ω)
Analog component waveform monitor
CH-1
CH-3
CH-2
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
VIDEO INPUT COMPONENT
Y
R-Y
B-Y
a
a
a
a
a
a
a : Use the same length cables (0.5 m)

Connections

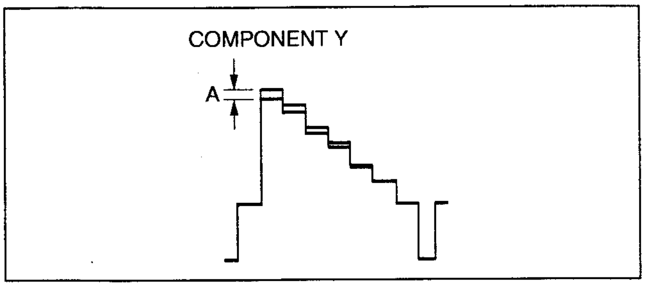
2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-1.)
- Warming up of equipment to be used (30 minutes or more).

1. Input Level Adjustment

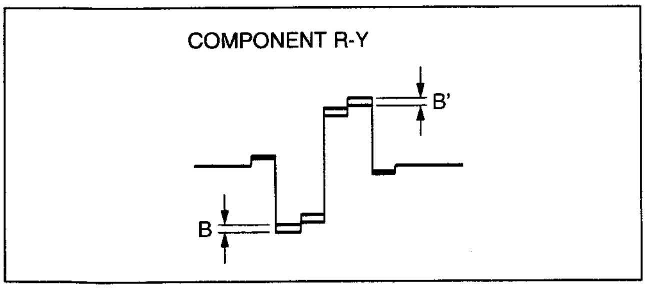
Y adjustment

1. Enter the maintenance mode.
2. Enter A22 : AD VR (LOOP).
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A22 : AD VR (LOOP)
3. Select "Y INPUT LEVEL".
4. Watch the Y signal with the component waveform monitor, then adjust the level A.
   Adj. point: A22 : AD VR (LOOP) : Y INPUT LEVEL
   Specification: Minimize the difference A.



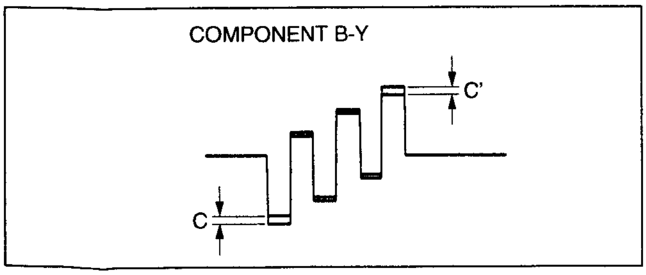
R-Y adjustment

5. Select "R-Y INPUT LEVEL".
6. Watch the R-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : R-Y INPUT LEVEL
   Specification: B = B'



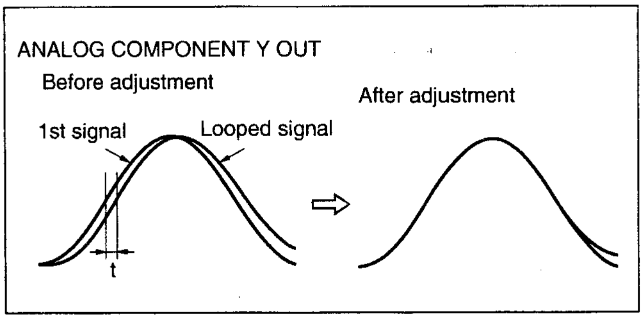
B-Y adjustment

7. Select "B-Y INPUT LEVEL".
8. Watch the B-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : B-Y INPUT LEVEL
   Specification: C = C'

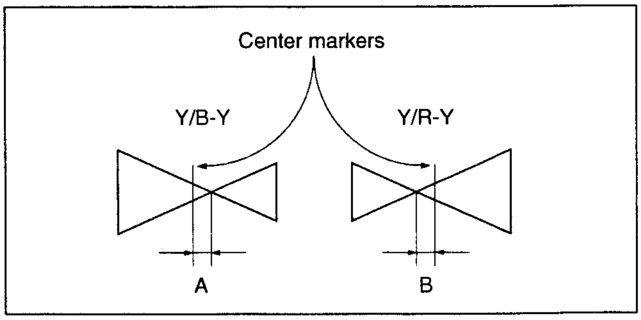


2. Input Phase Adjustment

1. Select "Y INPUT PHASE".
2. Watch the Y signal with the component waveform monitor.
3. To display 2T pulse portion, zoom in the horizontal axis of the component waveform monitor.
4. Adjust so that 1st signal and looped signal overlap.
   Adj. point: A22 : AD VR (LOOP) : Y INPUT PHASE
   Specification: t ≦ 20 ns



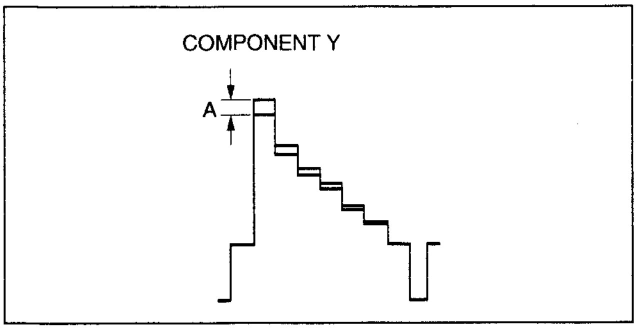
5. Set the component waveform monitor to BOWTIE mode.
6. Select "Y/B-Y INPUT DELAY".
7. Adjust the cross point of Y/B-Y.
   Adj. point: A22 : AD VR (LOOP) : Y/B-Y INPUT DELAY
   Specification: A = 0 ± 10 ns (Center marker is reference.)
8. Select "Y/R-Y INPUT DELAY".
9. Adjust the cross point of Y/R-Y.
   Adj. point: A22 : AD VR (LOOP) : Y/R-Y INPUT DELAY
   Specification: B = 0 ± 10 ns (Center marker is reference.)



3. Betacam Input Level Adjustment

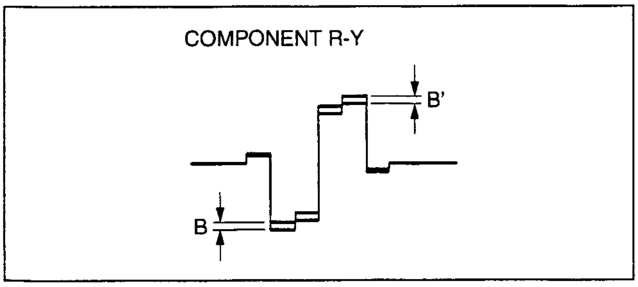
Y adjustment

1. Select "B-CAM IN LEVEL".
2. Watch the Y signal with the component waveform monitor, then adjust the level A.
   Adj. point: A22 : AD VR (LOOP) : B-CAM IN LEVEL
   Specification: Minimize the difference A.



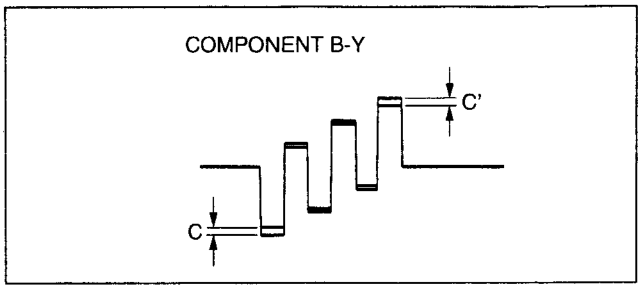
R-Y adjustment

3. Select "B-CAM R-Y IN LEVEL".
4. Watch the R-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : B-CAM R-Y IN LEVEL
   Specification: B = B'



B-Y adjustment

5. Select "B-CAM B-Y IN LEVEL".
6. Watch the B-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : B-CAM B-Y IN LEVEL
   Specification: C = C'



7. To exit A22 : AD VR (LOOP) , press the F6 (EXIT) button once.

4. Saving the Data

1. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".
2. Exit the maintenance mode.
3. For DVW series:
   Reset the switches and function menu settings to the customer setting. (Refer to Section 8-6-2.)

8-6-10. Preparation in Alternative Mode (HDW/MSW series)

Notes

- Be sure to perform the adjustments in the alternative mode after completing the adjustments in the standard mode.
- As for the standard mode and alternative mode, refer to Section 8-6-1.
- The settings of the VTR's switches are the same as the Preparation in the standard mode.
- "NTSC model" means the models usually operated in 59.94 Hz/525 mode.
  "PAL model" means the models usually operated in 50 Hz/625 mode.

For NTSC Model

1. Re-set the SUB-ITEM settings of the ITEM-709 and ITEM-713 in the setup extended menu to the customer settings. (Refer to step 4 in Section 8-6-2.)
2. Switch the setting of setup menu to the 50 Hz or 625 mode with the setup menu ITEM-013. (Refer to the operation manual.)
3. Set the analog composite monitor to the PAL mode.

For PAL Model

1. Switch the setting of setup menu to the 59.94 Hz or 525 mode with the setup menu ITEM-013. (Refer to the operation manual.)
2. Set the analog composite monitor to the NTSC mode.
3. Set the ITEM-709 and -713 in the setup extended menu as follows:

ITEM No. SUB-ITEM	Customer setting	Setting at adjustment
709 : CAV LEVEL FORMAT		
0[*1]. INPUT CAV LEVEL		⇨ B-CAM
1. OUTPUT CAV LEVEL		⇨ B-CAM
713 : VIDEO SETUP REFERENCE LEVEL		
0[*1]. MASTER LEVEL		⇨ 0.0%
1[*1]. INPUT LEVEL		⇨ MSTER
2[*1]. VBLK REMOVE CNT		⇨ REMOV
3[*1]. BETACAM PB LEVEL		⇨ MSTER
4. OUTPUT LEVEL		⇨ MSTER

*1: MSW recorder only

8-6-11. Composite Video Output Adjustment (HDW/MSW: Alternative Mode)

Note

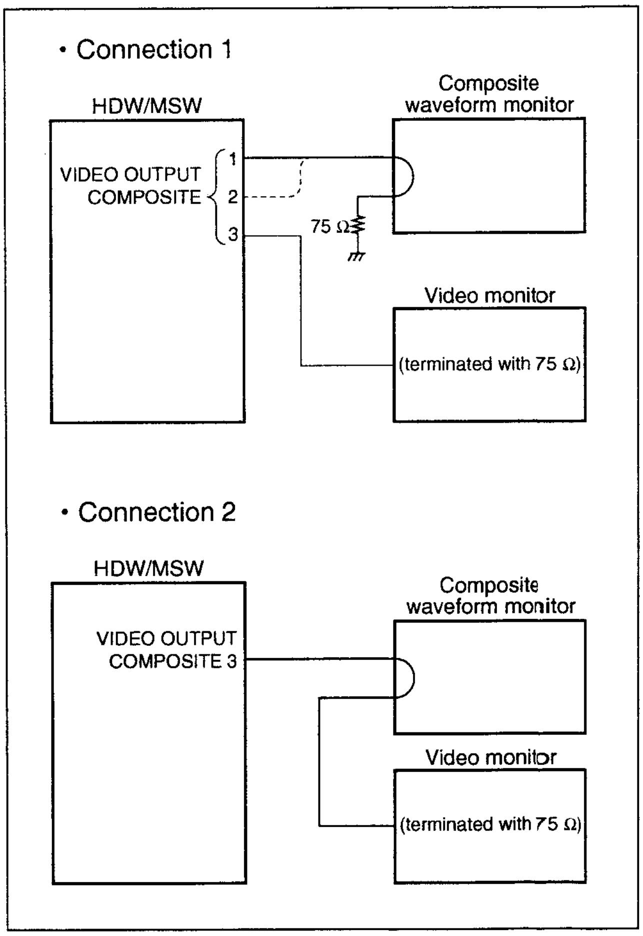
For the composite video output adjustment in the standard mode, refer to Section 8-6-3.

Tools

- Analog composite waveform monitor
  For NTSC model:
  Tektronix 1751A, or equivalent
  For PAL model:
  Tektronix 1750A, or equivalent
- Analog composite video monitor
- 75 Ω terminator

Preparation

1. Connect the equipment as shown Connection 1 on Figure "Connections".


• Connection 1
HDW/MSW
Composite waveform monitor
VIDEO OUTPUT COMPOSITE
1
2
3
75 Ω
Video monitor
(terminated with 75 Ω)
• Connection 2
HDW/MSW
Composite waveform monitor
VIDEO OUTPUT COMPOSITE 3
Video monitor
(terminated with 75 Ω)

Connections

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

Output Level Adjustment

1. Enter the maintenance mode.
2. Enter the C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/ VIDEO → C21 : VIDEO TEST SG
3. Select the following test signal.
   NTSC model: 100% Color Bars
   PAL model: 75% Color Bars
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.
5. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A20 : VPR VR

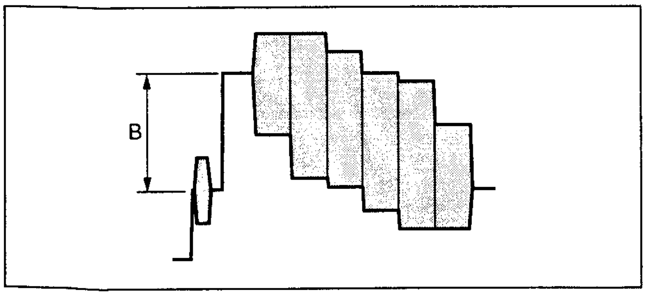
Check (Adjustment)

6. Connect the analog composite waveform monitor to each VIDEO OUTPUT COMPOSITE connector, then check the white peak level. If the difference B is not within the specification, adjust it.

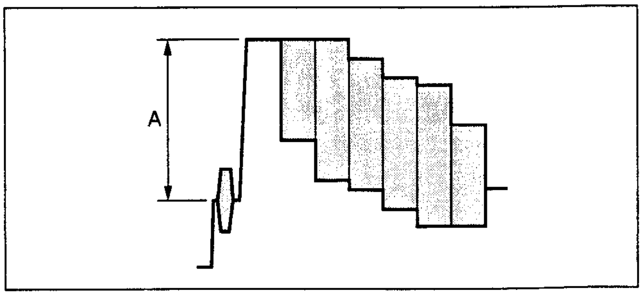
   Notes

   - The outputs of VIDEO OUTPUT COMPOSITE 1, 2 and 3 connectors cannot be adjusted separately.
   - When checking/adjusting the output of VIDEO OUTPUT COMPOSITE 3 (SUPER) connector, change the connection of the video monitor as Connection 2 on the previous page.
   - The menu display of the maintenance mode is superimposed in the output of VIDEO OUTPUT COMPOSITE 3 (SUPER) connector. If the superimposed picture obstructs, set the F4 (CHARA) of function menu Page4 to OFF. (Be sure to reset it to ON after checking/adjusting.)

		Adjustment point	**Specification**	
Output channel	**[Connection]**	**(A20 : VPR VR)**	**NTSC model**	**PAL model**
COMPOSITE 1 or 2	[Connection 1]	VIDEO OUT LEVEL	B = 700 ±7 mV	A = 100 ±1 IRE
COMPOSITE 3	[Connection 2]			(A = 714 ±7 mV)



NTSC model



PAL model

7. To exit A20 : VPR VR, press the F6 (EXIT) button once.

Saving the Data

When the adjustment in step 6 was not performed, skip over to step 8.

8. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.

8-6-12. Component Video Output (D1) Adjustment (HDW/MSW: Alternative Mode)

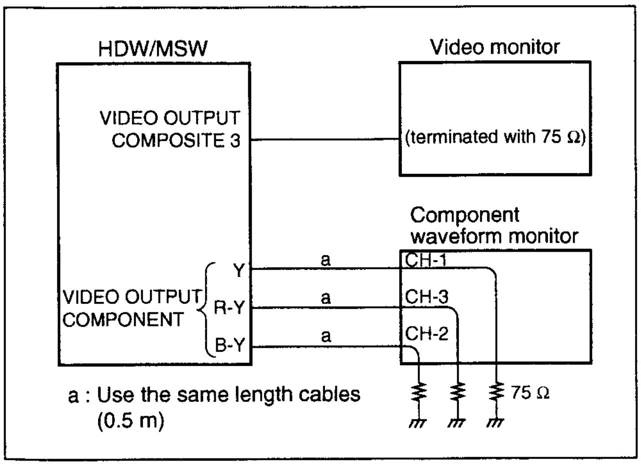
Note

For the component video output adjustment in the standard mode, refer to Section 8-6-4.

Tools

- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- 75 Ω terminators (3 pieces)

Preparation


HDW/MSW
Video monitor
VIDEO OUTPUT COMPOSITE 3
(terminated with 75 Ω)
Component waveform monitor
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
a
a
a
CH-1
CH-3
CH-2
75 Ω
a : Use the same length cables (0.5 m)

1. Connect the equipment.

Connection

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

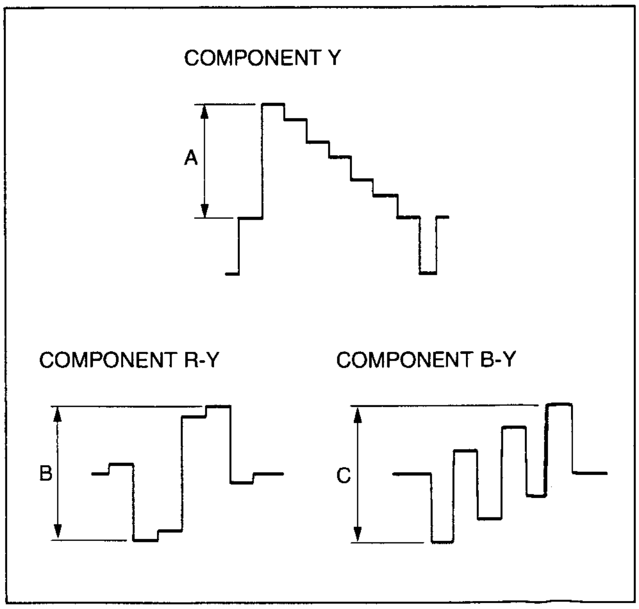
Output Level Adjustment

1. Enter the maintenance mode.
2. Enter C21 : VIDEO TEST SG.
   Maintenance mode → M0 : CHECK → C2 : AUDIO/VIDEO → C21 : VIDEO TEST SG
3. Select the test signal "100% Color Bars"
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.
5. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR

Check (Adjustment)

6. Check each specified part's level of VIDEO OUTPUT COMPONENT outputs (Y/R-Y/B-Y) on the waveform monitor.
   If any level is not within the specification, adjust it.

Output	Adj. point (A20 : VPR VR)	Specification
Y	Y OUTPUT LEVEL	A = 700 ±7 mV
R-Y	R-Y OUTPUT LEVEL	B = 700 ±7 mV p-p
B-Y	B-Y OUTPUT LEVEL	C = 700 ±7 mV p-p


COMPONENT Y
A
COMPONENT R-Y
COMPONENT B-Y
B
C

7. To exit A20 : VPR VR, press the F6 (EXIT) button once.

Saving the Data

When the adjustment was not performed in step 6, skip over to step 9.

8. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

9. Exit the maintenance mode.

8-6-13. Component Video Output (Betacam) Adjustment (for HDW/MSW PAL Model Only in 59.94 Hz or 525 Mode)

For the component video output (Betacam) adjustment to the PAL model under the 59.94 Hz or 525 mode, perform Section 8-6-5.

8-6-14. Reference Color Frame Pulse Check (HDW/MSW: Alternative Mode)

Note

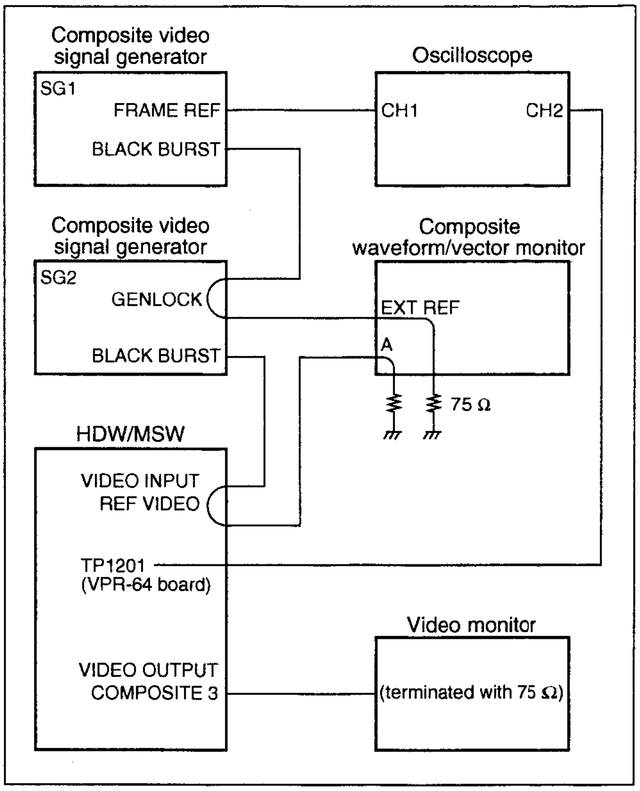
For the reference color frame pulse check in the standard mode, refer to Section 8-6-6.

Tools

- Analog composite video signal generator (SG1)
  For NTSC model:
  Tektronix TSG-131A or equivalent
  For PAL model:
  Tektronix TSG-130A or equivalent
- Analog composite video signal generator (SG2)
  For NTSC model:
  Tektronix 1411 or equivalent
  For PAL model:
  Tektronix 1410 or equivalent
- Analog composite waveform/vector monitor
  For NTSC model:
  Tektronix 1751A, or equivalent
  For PAL model:
  Tektronix 1750A, or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Analog composite video monitor
- 75 Ω terminators (2 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
SG1
FRAME REF
BLACK BURST
Oscilloscope
CH1
CH2
Composite video signal generator
SG2
GENLOCK
BLACK BURST
Composite waveform/vector monitor
EXT REF
A
75 Ω
HDW/MSW
VIDEO INPUT
REF VIDEO
TP1201
(VPR-64 board)
Video monitor
VIDEO OUTPUT
COMPOSITE 3
(terminated with 75 Ω)

Connection

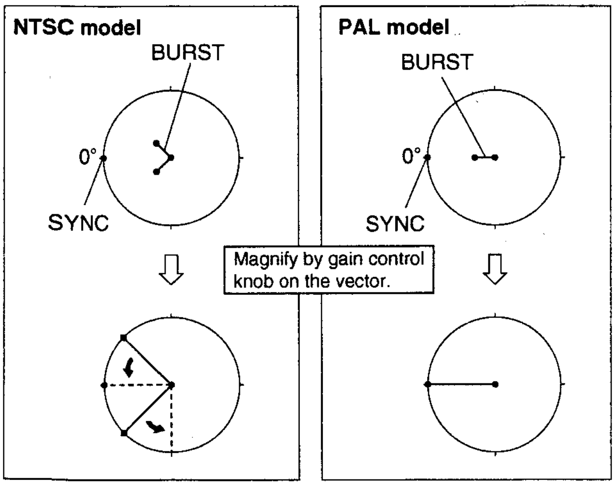
2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

1. Setting of Composite Waveform/Vector Monitor

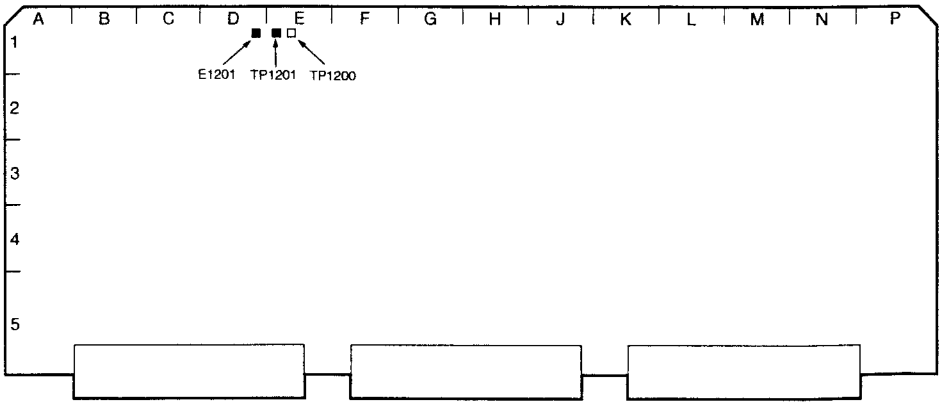
In this section, the analog composite waveform/vector monitor is abbreviated "vector" for short.

1. Set the vector as follows:
   SCH mode
   INPUT: CH-A
   EXT REF
2. Align the SYNC phase to 0 degree using the vector's PHASE knob so that the beam spot (SYNC) moves in the shortest route. (Refer to figure below.)
3. Align the BURST to regular portion on the vector using the signal generator SG2's SC PHASE knob.
4. Align the BURST's beam spot(s) to the circle scale on the vector using the gain control (knob) on the vector.
5. **For NTSC model only**
   Align the BURST to the specified positions as the dotted lines of the following figure using the vector's PHASE knob.


NTSC model
BURST
0°
SYNC
PAL model
BURST
0°
SYNC
Magnify by gain control knob on the vector.

2. Reference Color Frame Pulse Check

1. Enter the maintenance mode.
2. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR
3. Connect and set the oscilloscope as follows:
   ALT display mode
   CH-2: TP1201/VPR-64(E-1), DC 2 V/DIV
   GND: E1201/VPR-64(D-1)
   TIME: 20 ms/DIV for NTSC model
   10 ms/DIV for PAL model
   TRIG: CH-1: DC 2 V/DIV
   (Connected SG2's FRAME REF output)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
1
2
3
4
5
E1201
TP1201
TP1200

VPR-64 Board (Side A)

4. Turn the signal generator SG2's SC PHASE control knob clockwise (↻) slowly until the waveform of the oscilloscope's CH-2 (TP1201) changes from ⓐ to ⓑ.
5. Measure the BURST phase (angle A) on the vector when just inverted the phase of CH-2 (TP1201) on the oscilloscope.
6. To return the position of the BURST signal to be displayed on the vector, turn SG2's SC PHASE control knob counterclockwise (↺).
7. Turn the signal generator SG2's SC PHASE control knob counterclockwise (↺) slowly until the waveform of the oscilloscope's CH-2 (TP1201) changes from ⓐ to ⓑ.
8. Measure the BURST phase (angle B) on the vector when just inverted the phase of CH-2 (TP1201) on the oscilloscope.
9. To return the position of the BURST signal to be displayed on the vector, turn SG2's SC PHASE control knob clockwise (↻).
10. Confirm that the difference between the angles A and B is within specification.
    If it is not within the specification, perform the following steps (1) and (2).
    Specification: A − B = 0 ± 10°
11. To exit the A20 : VPR VR, press the F6 (EXIT) button.

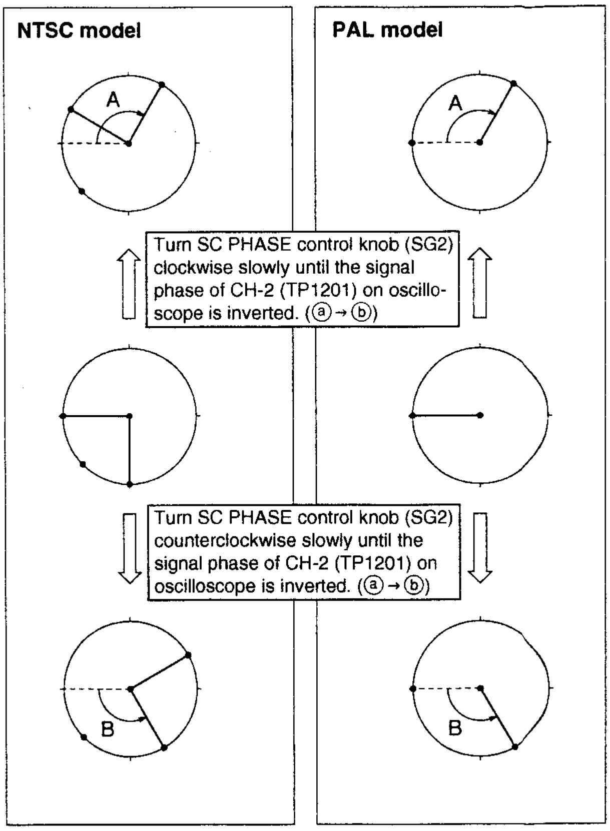
Perform following steps (1) and (2) when the specification in step 10 was not satisfied.

(1) Add/subtract 1 to/from the data value of "REF 1st FLD DET" in the A20 : VPR VR.

    Note

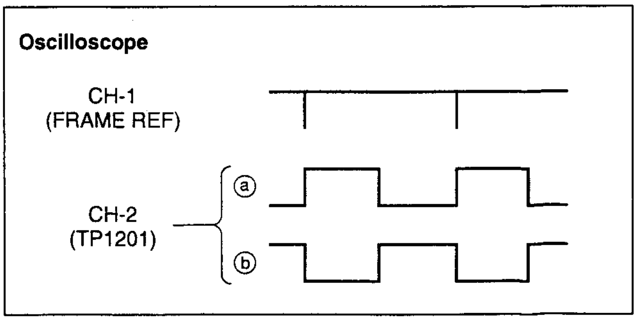
    The data increase/decrease depends on the angles A and B measured in steps 5 and 8.
    A > B : Subtract 1 from the data value.
    A < B : Add 1 to the data value.

(2) Return to step 4.



Turn SC PHASE control knob (SG2) clockwise slowly until the signal phase of CH-2 (TP1201) on oscilloscope is inverted. (ⓐ→ⓑ)

Turn SC PHASE control knob (SG2) counterclockwise slowly until the signal phase of CH-2 (TP1201) on oscilloscope is inverted. (ⓐ→ⓑ)



Saving the Data

Perform the following step 12 when the data of "REF 1st FLD DET" in A20 : VPR VR was changed.

12. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

    Note

    To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

13. Exit the maintenance mode.

8-6-15. Internal 4fsc Frequency Adjustment (HDW/MSW: Alternative Mode)

Note

For the internal 4fsc frequency adjustment in the standard mode, refer to Section 8-6-7.

Tools

- Frequency counter:
  Advantest TR5821 or equivalent
- Analog composite video monitor

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

Frequency Adjustment

1. Supply no signal to REF. VIDEO INPUT connector, or disconnect cables to them.
2. Connect the frequency counter to TP1200(E-1) on the VPR-64/91 board. GND: E1201/VPR-64(D-1).
3. Enter the maintenance mode.
4. Enter A20 : VPR VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A20 : VPR VR
5. Adjust the frequency on the frequency counter.
   Adj. point: A20 : VPR VR : INT 4FSC FREQ
   Specification: 17,734,476 ±50 Hz for NTSC model
   14,318,181 ±50 Hz for PAL model
6. To exit A20 : VPR VR, press the F6 (EXIT) button once.

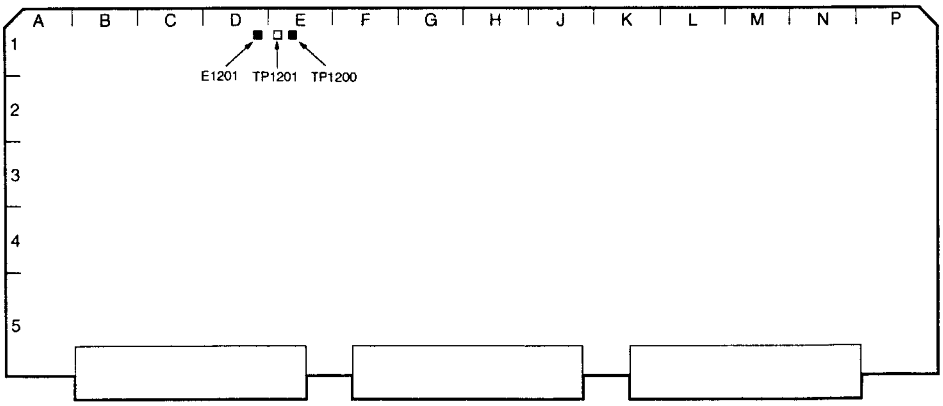
Saving the Data

7. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

8. Exit the maintenance mode.



VPR-64 Board (Side A)

8-6-16. Composite Video Input Adjustment (MSW Recorder: Alternative Mode)

Notes

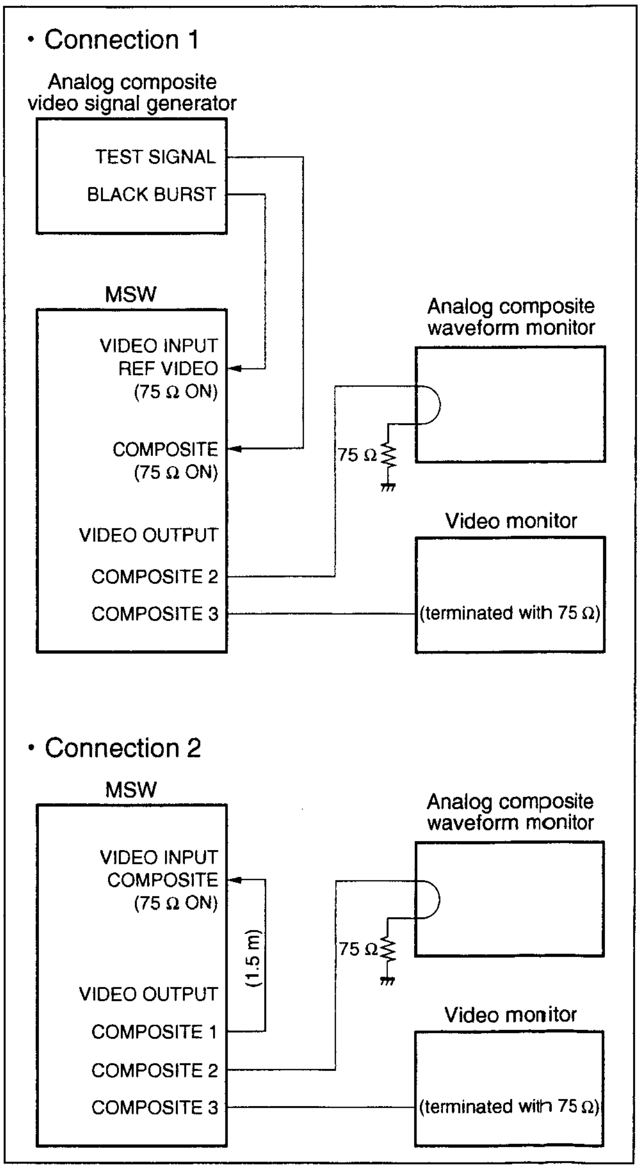
- Models to be adjusted: MSW-2000, MSW-A2000/A2000P, MSW-M2000/M2000P, MSW-M2000E/M2000EP
- For the composite video input adjustment in the standard mode, refer to Section 8-6-8.

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-131A, or equivalent
  For PAL model:
  Tektronix TSG-130A, or equivalent
- Analog composite waveform monitor
  For NTSC model:
  Tektronix 1751A, or equivalent
  For PAL model:
  Tektronix 1750A, or equivalent
- Oscilloscope:
  Tektronix TDS460A or equivalent
- Analog composite video monitor
- 75 Ω terminator

Preparation

1. Connect the equipment as shown Connection 1 on Figure "Connections".


• Connection 1
Analog composite video signal generator
TEST SIGNAL
BLACK BURST
MSW
VIDEO INPUT
REF VIDEO
(75 Ω ON)
COMPOSITE
(75 Ω ON)
VIDEO OUTPUT
COMPOSITE 2
COMPOSITE 3
Analog composite waveform monitor
75 Ω
Video monitor
(terminated with 75 Ω)
• Connection 2
MSW
VIDEO INPUT
COMPOSITE
(75 Ω ON)
(1.5 m)
VIDEO OUTPUT
COMPOSITE 1
COMPOSITE 2
COMPOSITE 3
Analog composite waveform monitor
75 Ω
Video monitor
(terminated with 75 Ω)

Connections

2. Conditions to be kept are:

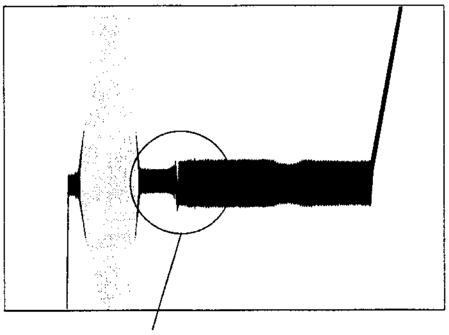
- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

1. Pedestal level Adjustment

1. Enter the maintenance mode.
2. Enter A25 : DEC VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A25 : DEC VR
3. Input the ramp signal from the signal generator.
4. Watch the burst signal portion of VIDEO OUTPUT COMPOSITE 2 output with the waveform monitor.
   - Setting of waveform monitor
     SWEEP: 1 H, MAG
     GAIN: ×5
     UNCAL: MAX
5. Adjust the pedestal level.
   Adj. point: A25 : DECVR: VIDEO PEDESTAL
   Specification: See the figure below.
6. To exit M1 : ADJUST, press the F6 (EXIT) button once.

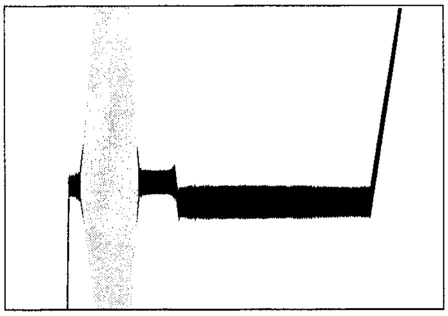
VIDEO OUTPUT COMPOSITE 2

OK



Spec.: Difference of pedestal portion is not recognized.

NG



2. Gain Adjustment (MANUAL/AGC)

1. Connect equipment as connection 2 on page 8-73.
2. Enter C22 : MULTI LOOP (10 TIMES).
   Maintenance mode → M0 : CHECK → C2 : AUDIO/ VIDEO → C22 : MULTI LOOP (10 TIMES)
3. Select "100% Color Bars" as test signal.
4. To exit M0 : CHECK, press the F6 (EXIT) button three times.

MANUAL

5. Enter A25 : DEC VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A25 : DEC VR
6. Select "VIDEO GAIN".
7. Adjust so that the specification is satisfied.
   Adj. point: A25 : DEC VR: VIDEO GAIN
   Specification: See the figure 1.

AGC

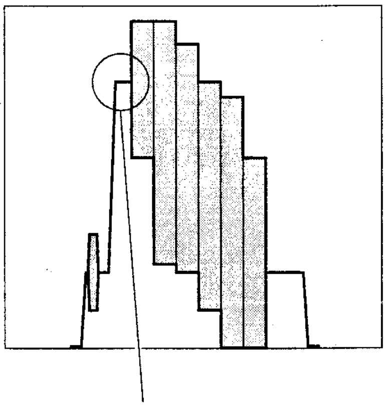
8. Select "AGC VIDEO GAIN".
9. Adjust so that the specification is satisfied.
   Adj. point: A25 : DEC VR: AGC VIDEO GAIN
   Specification: See the figure 1.
10. To exit A25 : DEC VR, press the F6 (EXIT) button once.

3. Pedestal Level Check

1. Reconnect equipment as connection 1 on page 8-73.
2. Input the ramp signal from the signal generator.
3. Watch the burst signal portion of VIDEO OUTPUT COMPOSITE 2 output with the waveform monitor.
   - Setting of waveform monitor
     SWEEP: 1 H, MAG
     GAIN: ×5
     UNCAL: MAX
4. Check that the pedestal portion is within the specification.
   If not, perform "1. Pedestal Level Adjustment" again.
   Specification: See the figure 2.

VIDEO OUTPUT COMPOSITE 2

OK



Spec.: The white level of the signal after looping overlaps on the white level of the 1st signal.

Note

The signal after looping is displayed in a state of overlapping on 1st signal on the screen of the waveform monitor.
They appear that the 1st signal is freezing and the signal after looping is changing the fluctuation level.

NG

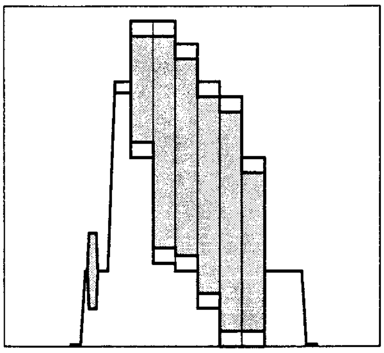
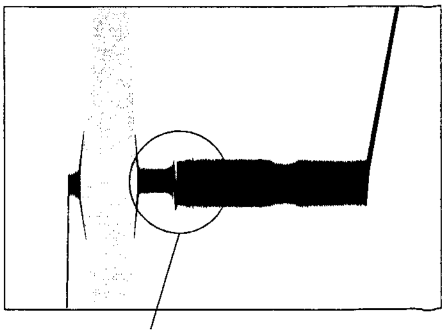


Figure 1. Gain Adjustment

VIDEO OUTPUT COMPOSITE 2

OK



Spec.: Difference of pedestal portion is not recognized.

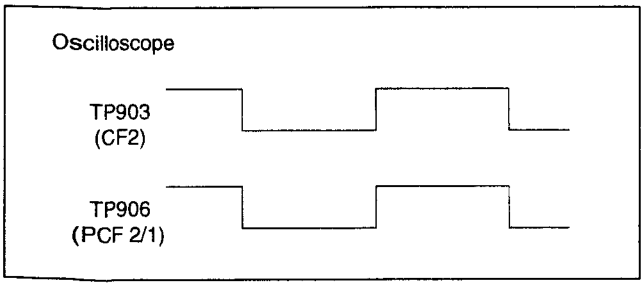
Figure 2. Pedestal Level Check

4. Color Frame Detection Adjustment

Note

Ensure that the video output SCH from the signal generator is within 0 ±5°.

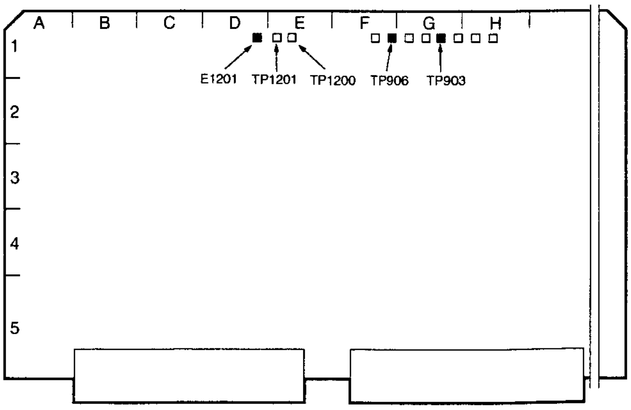
1. Input the ramp signal from the signal generator.
2. Enter A24 : INPUT CF DETECT.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A24 : INPUT CF DETECT
   Note
   In this time, "Manual" is displayed on the video monitor because the unit is in the manual adjustment mode.
3. Change the mode to the automatic adjustment mode.
   Note
   To change the adjustment mode from "Manual" to "Auto":
   With the asterisk cursor (*) is aligned to "Manual", turn the MULTI CONTROL knob clockwise (↻) while pressing the HOME button.
   Then "Auto (Push SET button)" will be displayed.
4. To execute the automatic adjustment, press the F5 (SET) button.
   - The displayed message on the video monitor will change to "Auto Adjusting ...". The displayed data value will also change.
5. Confirm the automatic adjustment completion on the video monitor.
   - Message "Auto Adjust Complete" is displayed when the automatic adjustment is completed.
6. Connect and set the oscilloscope as follows:
   CH-1: TP903/VPR-64(G-1) , DC 500 mV/DIV
   GND: E1201/VPR-64(D-1)
   CH-2: TP906/VPR-64(F-1) , DC 500 mV/DIV
   GND: E1201/VPR-64(D-1)
   TIME: 20 ms/DIV
7. Check that the two waveforms (TP903 and TP906) are the same phase.



8. To exit the A24 : INPUT CF DETECT, press the F6 (EXIT) button once.

5. Saving the Data

1. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
   Note
   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".
2. Exit the maintenance mode.



VPR-64 Board (Side A)

8-6-17. Component Video Input Adjustment (MSW Recorder: Alternative Mode)

Notes

- Models to be adjusted: MSW-2000,
  MSW-A2000/A2000P,
  MSW-M2000/M2000P,
  MSW-M2000E/M2000EP
- For the component video input adjustment in the standard mode, refer to Section 8-6-9.

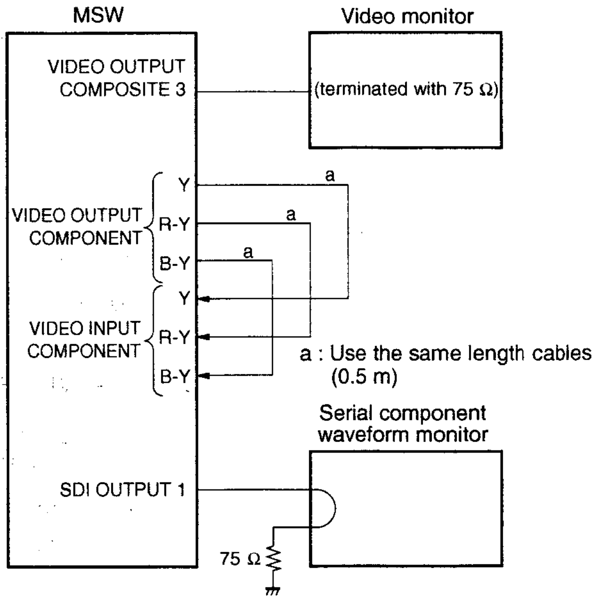
Tools

- Component waveform monitor:
  Tektronix WFM300A, WFM601, or equivalent
- Analog composite video monitor
- 75 Ω terminator

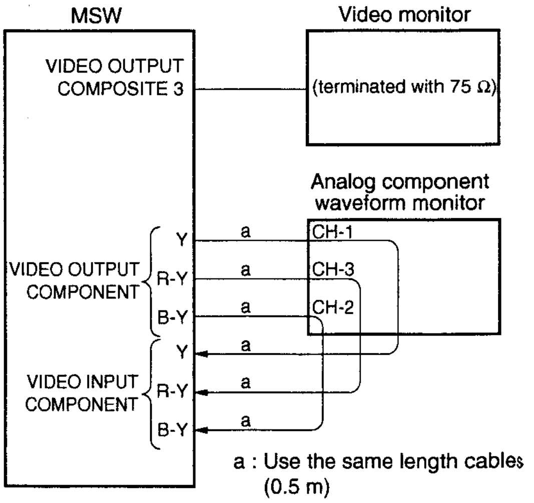
Preparation

1. Connect the equipment.

- In the case of serial component waveform monitor (e.g. WFM601)


MSW
Video monitor
VIDEO OUTPUT COMPOSITE 3
(terminated with 75 Ω)
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
a
a
a
VIDEO INPUT COMPONENT
Y
R-Y
B-Y
a : Use the same length cables (0.5 m)
Serial component waveform monitor
SDI OUTPUT 1
75 Ω

- In the case of analog component waveform monitor (e.g. WFM300A)


MSW
Video monitor
VIDEO OUTPUT COMPOSITE 3
(terminated with 75 Ω)
Analog component waveform monitor
CH-1
CH-3
CH-2
VIDEO OUTPUT COMPONENT
Y
R-Y
B-Y
VIDEO INPUT COMPONENT
Y
R-Y
B-Y
a
a
a
a
a
a
a : Use the same length cables (0.5 m)

Connections

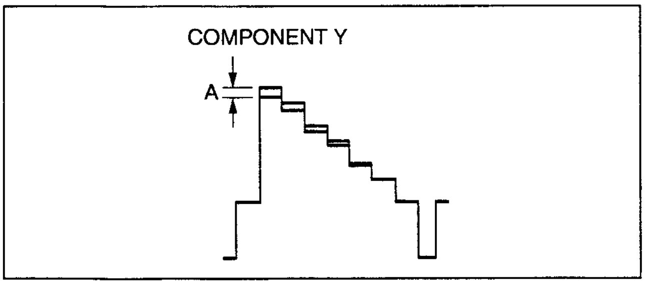
2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-6-2.)
- Warming up of equipment to be used (30 minutes or more).

1. Input Level Adjustment

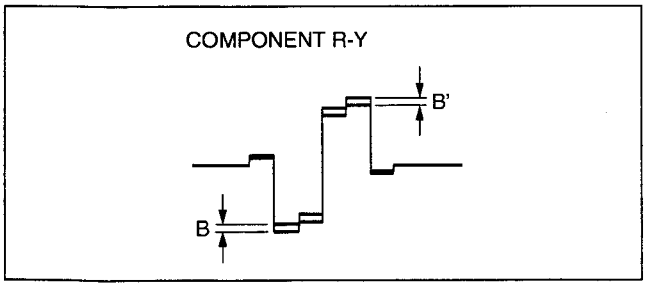
Y adjustment

1. Enter the maintenance mode.
2. Enter A22 : AD VR (LOOP).
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/ VIDEO → A22 : AD VR (LOOP)
3. Select "Y INPUT LEVEL".
4. Watch the Y signal with the component waveform monitor, then adjust the level A.
   Adj. point: A22 : AD VR (LOOP) : Y INPUT LEVEL
   Specification: Minimize the difference A.



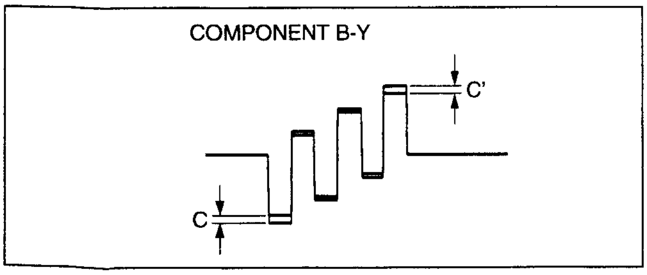
R-Y adjustment

5. Select "R-Y INPUT LEVEL".
6. Watch the R-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : R-Y INPUT LEVEL
   Specification: B = B'



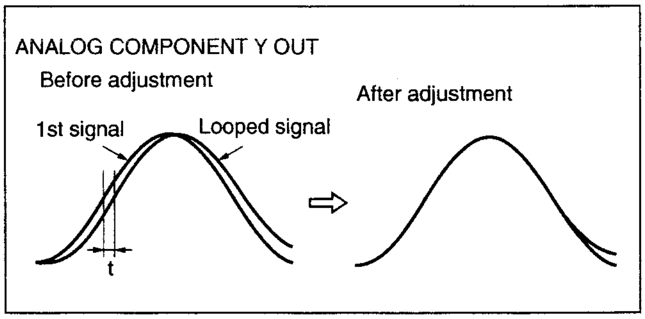
B-Y adjustment

7. Select "B-Y INPUT LEVEL".
8. Watch the B-Y signal with the component waveform monitor, then adjust the looped signal level.
   Adj. point: A22 : AD VR (LOOP) : B-Y INPUT LEVEL
   Specification: C = C'

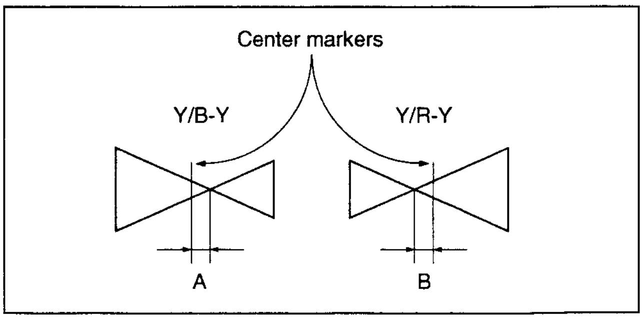


2. Input Phase Adjustment

1. Select "Y INPUT PHASE".
2. Watch the Y signal with the component waveform monitor.
3. To display 2T pulse portion, zoom in the horizontal axis of the component waveform monitor.
4. Adjust so that 1st signal and looped signal overlap.
   Adj. point: A22 : AD VR (LOOP) : Y INPUT PHASE
   Specification: t ≦ 20 ns



5. Set the component waveform monitor to BOWTIE mode.
6. Select "Y/B-Y INPUT DELAY"
7. Adjust the cross point of Y/B-Y.
   Adj. point: A22 : AD VR (LOOP) : Y/B-Y INPUT DELAY
   Specification: A = 0 ± 10 ns (Center marker is reference.)
8. Adjust the cross point of Y/R-Y.
   Adj. point: A22 : AD VR (LOOP) : Y/R-Y INPUT DELAY
   Specification: B = 0 ± 10 ns (Center marker is reference.)



3. Saving the Data

1. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   To cancel the saving of adjusted data and recover it to previous condition, execute "ALL DATA PREVIOUS".

2. Exit the maintenance mode.

8-6-18. Perfection in Video System Alignment (HDW/MSW series)

1. **For PAL model only**
   Reset the SUB-ITEM settings of the ITEM-709 and 713 in the setup extended menu to the customer settings. (Refer to step 3 in Section 8-6-10.)
2. Switch the operation mode to the standard mode with the setup menu ITEM-013.
3. Reset the switches and function menu settings to the customer setting. (Refer to Section 8-6-2.)

8-7. Analog Betacam PB System Alignment

Note

These adjustments are not required for HDW-2000/D2000, DVW-2000/P and MSW-2000.

8-7-1. Adjustment Overview

Perform this section when aligning the video system in the analog Betacam PB system.
When aligning the audio system (LAU/AFM) in the analog Betacam PB system, refer to Section 8-5.

Note

For NTSC model, be sure to adjust in the 59.94 Hz or 525 mode.
For PAL model, be sure to adjust in the 50 Hz or 625 mode.
If not, change the video system using the setup menu ITEM-013 : 525/625 SYSTEM SELECT before adjusting. (For the ITEM-013, refer to the operation manual.)

In this section, perform the adjustments for the following boards. For adjustment items and its order, refer to "Adjustment Items" (next page).

- DM-123 board
- EQ-84 board

Note

When the EQ-84 board was replaced/repaired, refer to Section 8-4.

Tools

To perform the analog Betacam PB system alignment, use the following equipment (or equivalent) and fixtures.

Note

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 20 minutes or more.

Analog composite video signal generator	Tektronix TSG-130A		For NTSC model
	Tektronix TSG-131A		For PAL model
Analog component video signal generator	Tektronix TSG-300		
Note It is required that the component video signal generator is able to output the 50% bowtie signal.			
Analog composite waveform/vector monitor	Tektronix 1750A		For NTSC model
	Tektronix 1751A		For PAL model
Analog component waveform monitor	Tektronix WFM300A		
Oscilloscope	Tektronix TDS460A		
Spectrum analyzer	Advantest R3261A		
Network analyzer	Anritsu MS420B		
Digital voltmeter	Advantest TR6845		
VISC phase adjustment tool		(Part No. J-6332-240-A)	For PAL model
Analog composite video monitor	(NTSC/PAL selectable type)		
Note Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.			
Extension board	EX-739	(Part No. A-8324-911-A)	
Cleaning tape	Sony BCT-HD12CL		
Alignment tapes	CR5-1B	(Part No. 8-960-096-41)	For NTSC model
	CR5-2A	(Part No. 8-960-097-44)	
	CR5-1B PS	(Part No. 8-960-096-91)	For PAL model
	CR5-2A PS	(Part No. 8-960-098-44)	
75 Ω terminators (5 pieces)			
Shorting clips (2 pieces)			

Adjustments

No.	Item			Adjustment point	Remarks
8-7-3	Initial data setting			All data of A3 : BETACAM PB (DM) All data of A4 : BETACAM PB (TBC)	
8-7-4	EQ RF output level adjustment				
		METAL Y		A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-A A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-Y-B	TP101/DM-123
		METAL C		A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-A A30 : RF GAIN VR (EQ VR) : RF GAIN METAL-C-B	TP301/DM-123
		OXIDE C		A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-C-A A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-C-B	TP301/DM-123
		OXIDE Y		A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-Y-A A30 : RF GAIN VR (EQ VR) : RF GAIN OXIDE-Y-B	TP101/DM-123
		Data saving		A3F : NV-RAM CONTROL	
8-7-5	Cosine equalizer adjustment	OMC DC offset		A35 : G-BAND/OMC DC VR : OMC DC METAL-Y A35 : G-BAND/OMC DC VR : OMC DC METAL-C A35 : G-BAND/OMC DC VR : OMC DC OXIDE-Y A35 : G-BAND/OMC DC VR : OMC DC OXIDE-C	Data set
		METAL Y	Group delay	⊘RV101/DM-123, ⊘RV102/DM-123	TP105/DM-123
			Main	A31 :COS EQ VR (METAL-Y) : MAIN METAL-Y-A A31 :COS EQ VR (METAL-Y) : MAIN METAL-Y-B	TP107/DM-123
			Sub	A31 :COS EQ VR (METAL-Y) : SUB METAL-Y-A A31 :COS EQ VR (METAL-Y) : SUB METAL-Y-B	Data set
		METAL C	Group delay	⊘RV301/DM-123, ⊘RV302/DM-123	TP305/DM-123
			Main	A32 :COS EQ VR (METAL-C) : MAIN METAL-C-A A32 :COS EQ VR (METAL-C) : MAIN METAL-C-B	TP307/DM-123
			Sub	A32 :COS EQ VR (METAL-C) : SUB METAL-C-A A32 :COS EQ VR (METAL-C) : SUB METAL-C-B	Data set (NTSC) TP306/DM-123 (PAL)
		OXIDE C	Group delay	⊘RV303/DM-123, ⊘RV304/DM-123	TP305/DM-123
			Main	A34 :COS EQ VR (OXIDE-C) : MAIN OXIDE-C-A A34 :COS EQ VR (OXIDE-C) : MAIN OXIDE-C-B	TP307/DM-123
			Sub	A34 :COS EQ VR (OXIDE-C) : SUB OXIDE-C-A A34 :COS EQ VR (OXIDE-C) : SUB OXIDE-C-B	TP306/DM-123
		OXIDE Y	Group delay	⊘RV104/DM-123	TP105/DM-123
			Main	A33 :COS EQ VR (OXIDE-Y) : MAIN OXIDE-Y-A A33 :COS EQ VR (OXIDE-Y) : MAIN OXIDE-Y-B	TP107/DM-123
			Sub	A33 :COS EQ VR (OXIDE-Y) : SUB OXIDE-Y-A A33 :COS EQ VR (OXIDE-Y) : SUB OXIDE-Y-B	TP106/DM-123
		Data saving		A3F : NV-RAM CONTROL	
8-7-6	Cosine equalizer provisional adjustment	**Note** This provisional adjustment explains how to adjust without using the network analyzer as opposed to adjustment (Section 8-7-5) using the network analyzer. Perform this provisional adjustment only when the network analyzer is not available for an urgent maintenance. Be sure to perform the adjustment (Section 8-7-5) using the network analyzer at a later date.			

(Continued)

No.	Item		Adjustment point	Remarks
8-7-7	DM RF output level adjustment	OXIDE Y	⊘RV112/DM-123	TP107/DM-123
		OXIDE C	⊘RV312/DM-123	TP307/DM-123
		METAL C	⊘RV311/DM-123	TP307/DM-123
		METAL Y	⊘RV111/DM-123	TP107/DM-123
8-7-8	GAUSS control level adjustment (MSW-M/HDW-M series only)	 Data saving	A38 : DEMO BAL/ETC. VR : GAUSS LEVEL A3F : NV-RAM CONTROL	TP401/TC104
8-7-9	OMC carrier balance adjustment	METAL Y	A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-B	TP109/DM-123
		METAL C	A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-B	TP309/DM-123
		OXIDE C	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-B	TP309/DM-123
		OXIDE Y	A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-B	TP109/DM-123
		Data saving	A3F : NV-RAM CONTROL	
8-7-10	OMC carrier balance provisional adjustment	**Note** This provisional adjustment explains how to adjust without using the spectrum analyzer as opposed to adjustment (Section 8-7-9) using the spectrum analyzer. Perform this provisional adjustment only when the spectrum analyzer is not available for an urgent maintenance. Be sure to perform the adjustment (Section 8-7-9) using the spectrum analyzer at a later date.		
8-7-11	Demodulator limiter balance adjustment			
		OXIDE Y	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y	TP502/DM-123
		METAL Y	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y	TP502/DM-123
		METAL C	A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C	TP706/DM-123
		OXIDE C	A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C	TP706/DM-123
		Data saving	A3F : NV-RAM CONTROL	
8-7-12	Non-linear output level adjustment			
		METAL Y	⊘RV503/DM-123	TP506/DM-123
		C	⊘RV703/DM-123 (MSW-A2000P only), ⊘RV704/DM-123	TP706/DM-123
		OXIDE Y	⊘RV504/DM-123	TP506/DM-123
8-7-13	PB frequency response adjustment			
		METAL Y	A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B	VIDEO OUTPUT COMPONENT Y
		METAL C	A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B	VIDEO OUTPUT COMPONENT R-Y/B-Y
		OXIDE Y	A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B	VIDEO OUTPUT COMPONENT Y
		OXIDE C	A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B	VIDEO OUTPUT COMPONENT R-Y/B-Y
		Data saving	A3F : NV-RAM CONTROL	
8-7-14	Drop-out compensation equalizer adjustment			
		METAL Y	⊘RV109/DM-123	TP112/DM-123
		METAL C	⊘RV309/DM-123	TP312/DM-123
		OXIDE Y	⊘RV310/DM-123	TP312/DM-123
		OXIDE C	⊘RV110/DM-123	TP112/DM-123

OMC : Over-Modulation Compensation circuit

(Continued)

No.	Item		Adjustment point	Remarks
8-7-15	DM RF output level readjustment	METAL Y	⊘RV111/DM-123	TP107/DM-123
		METAL C	⊘RV311/DM-123	TP307/DM-123
		OXIDE C	⊘RV312/DM-123	TP307/DM-123
		OXIDE Y	⊘RV112/DM-123	TP107/DM-123
8-7-16	RF envelope adjustment	Y	⊘RV113/DM-123	TP112/DM-123
		C	⊘RV313/DM-123	TP312/DM-123
		TH Ach level	A36 : DO TH/ENV TH VR : ENV-TH-A	Data set
		TH Bch level	A36 : DO TH/ENV TH VR : ENV-TH-B	Data set
		Data saving	A3F : NV-RAM CONTROL	
8-7-17	DM search picture adjustment	Offset	A38 : DEMO BAL/ETC. VR : SV TAPE SPD OFFSET	TP508/DM-123
		Y	A38 : DEMO BAL/ETC. VR : VAR DEEMP-Y	TP503/DM-123
		C	A38 : DEMO BAL/ETC. VR : VAR DEEMP-C	TP703/DM-123
		Gain	⊘RV506/DM-123	TP506/DM-123
		Data saving	A3F : NV-RAM CONTROL	
8-7-18	Component output level adjustment			
		METAL Y METAL C	A41 : LVL/IMP/PHASE VR : AD LEVEL METAL-Y A41 : LVL/IMP/PHASE VR : AD LEVEL METAL-C	VIDEO OUTPUT COMPONENT
		OXIDE C OXIDE Y	A41 : LVL/IMP/PHASE VR : AD LEVEL OXIDE-C A41 : LVL/IMP/PHASE VR : AD LEVEL OXIDE-Y	VIDEO OUTPUT COMPONENT
		Data saving	A4F : NV-RAM CONTROL	
8-7-19	VCO lock-in range adjustment	Y	⊘LV1401/DM-123	TP1401/DM-123
		C	⊘LV1601/DM-123	TP1601/DM-123
8-7-20	TBC VCO free-running adjustment*3			
		Y	⊘RV1301/DM-123	Video monitor
		C	⊘RV1501/DM-123	Video monitor
8-7-21	FAST VCO tracking adjustment (HDW/MSW only)	Offset	A42 : YC DL/Y TR VR : Y TR OFFSET	Video monitor
		Data saving	A4F : NV-RAM CONTROL	
8-7-22	PB video phase adjustment		A41 : LVL/IMP/PHASE VR : VIDEO PH A40 : TBC IC DATA : SQ Y RZ*1	VIDEO OUTPUT COMPONENT Y
		Data saving	A4F : NV-RAM CONTROL	
8-7-23	TBC Y/C delay rough adjustment		**NTSC model:** A42 : YC DL VR : Y/C DELAY M-A A42 : YC DL VR : Y/C DELAY M-B **PAL model:** A42 : YC DL/Y TR VR : Y/C DELAY M-A A42 : YC DL/Y TR VR : Y/C DELAY M-B ⊘RV1501/DM-123 A40 : TBC IC DATA : SQ C RZ*2	VIDEO OUTPUT COMPONENT
		Data saving	A4F : NV-RAM CONTROL	

*1: When the specification is not satisfied even after adjusting A41 : LVL/IMP/PHASE VR : VIDEO PH, change the data of A40 : TBC IC DATA : SQ Y RZ.

*2: When the specification is not satisfied even after adjusting A42 : YC DL VR : Y/C DELAY M-A, change the data of A40 : TBC IC DATA : SQ C RZ.

*3: Perform this adjustment only when RV1301 on the DM-123 board has been replaced or turned accidentally. Be sure to perform the adjustments from Section 8-7-20 through 8-7-26.

(Continued)

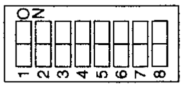
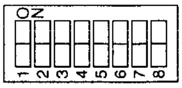
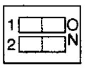
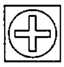
No.	Item		Adjustment point	Remarks
8-7-24	Impact error offset adjustment	Y	A41 : LVL/IMP/PHASE VR : IMP OFFSET-Y	Video monitor
		C	A41 : LVL/IMP/PHASE VR : IMP OFFSET-C	Video monitor
		Data saving	A4F : NV-RAM CONTROL	
8-7-25	TBC Y/C delay adjustment	METAL	**NTSC model:** A42 : YC DL VR : Y/C DELAY M-A A42 : YC DL VR : Y/C DELAY M-B **PAL model:** A42 : YC DL/Y TR VR : Y/C DELAY M-A A42 : YC DL/Y TR VR : Y/C DELAY M-B	VIDEO OUTPUT COMPONENT
		OXIDE	**NTSC model:** A42 : YC DL VR : Y/C DELAY O-A A42 : YC DL VR : Y/C DELAY O-B **PAL model:** A42 : YC DL/Y TR VR : Y/C DELAY O-A A42 : YC DL/Y TR VR : Y/C DELAY O-B	VIDEO OUTPUT COMPONENT
		Data saving	A4F : NV-RAM CONTROL	
8-7-26	VISC phase adjustment		A41 : LVL/IMP/PHASE VR : VISC PH A40 : TBC IC DATA : VISC PHASE *4	VIDEO OUTPUT COMPONENT Y
		Data saving	A4F : NV-RAM CONTROL	
8-7-27	Data setting (Alternative Mode)		A3 : BETACAM PB (DM) A4 : BETACAM PB (TBC)	

*4: When the specification is not satisfied even after adjusting A41 : LVL/IMP/PHASE VR : VISC PH, change the data of A40 : TBC IC DATA : VISC PHASE.

8-7-2. Common Preparation

Set switches, function menu, setup extended menu, and others specified before starting the adjustments. After completing all the adjustments, be sure to reset them to the customer settings.

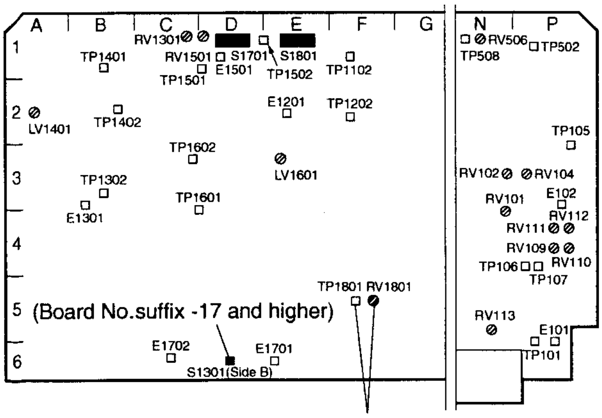
1. Turn the power off.
2. Set the switches on the circuit boards as listed below:

Board	Ref. No.	Customer setting	Setting at adjustment
DM-123	S1701 (D-1)		⇨ All OFF (lower side)
	S1801 (E-1)		⇨ All OFF (lower side)
	S1301* (D-6, side B) (Board No. suffix 17 and higher)		⇨ All OFF (left side)
	RV1801* (G-5) (Board No. suffix 15 and higher)		⇨ ∩ fully (0 Ω)
SS-89	S1502 (B-1) Bit 1		⇨ ON (upper side) (to enable the operation of the setup extended menu)

*: S1301 and RV1801 are not used for adjustment. Keep settings specified as above.

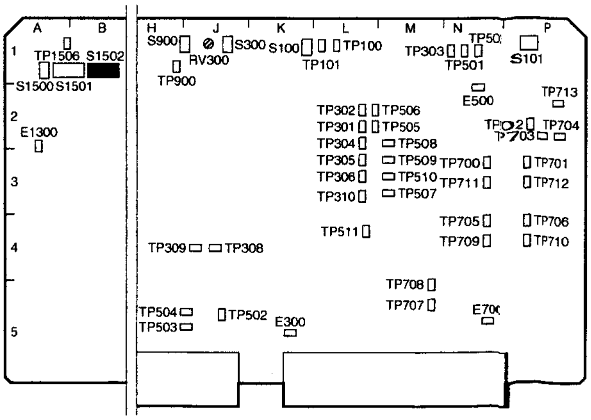
3. Turn on the power.
4. For HDW/MSW series:
   Check that the unit is set into the following mode.
   If it is not, change the settings of the setup menu. (Refer to the operation manual.)

Model	Mode	Setup menu
NTSC model	59.94 Hz or 525	ITEM-013
PAL model	50 Hz or 625	


A
B
C
D
E
F
G
N
P
1
2
3
4
5
6
RV1301
TP1401
RV1501
S1701
S1801
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
TP1801 RV1801
E1702
E1701
S1301(Side B)
RV506
TP502
TP508
TP105
RV102
RV104
RV101
E102
RV112
RV111
RV109
TP106
RV110
TP107
RV113
E101
TP101
(Board No.suffix -17 and higher)

(Board No.suffix -15 and higher)

DM-123 Board (Side A)


A
B
H
J
K
L
M
N
P
1
2
3
4
5
TP1506
S1502
S1500
S1501
E1300
S900
RV300
S300
S100
TP100
TP303
TP501
S101
TP101
TP900
E500
TP713
TP302
TP506
TP301
TP505
TP304
TP508
TP305
TP509
TP700
TP701
TP306
TP510
TP711
TP712
TP310
TP507
TP703
TP704
TP511
TP705
TP706
TP709
TP710
TP309
TP308
TP708
TP707
TP504
TP503
TP502
E300
E700

SS-89 Board (Side A)

5. Set the VTR's switches and function menu as follows:

Location Item			Customer setting		Setting at adjustment
Switch panel	KEY INHIBIT switch		__________	⇨	OFF
Upper control panel	REMOTE:	1 (9P)	__________	⇨	OFF (Light off)
		2 (50P)	__________	⇨	OFF (Light off)
Function menu	HOME1	F2 (PB/EE)	__________	⇨	PB
	Page1	F1 (TCG)*1	__________	⇨	INT
		F2 (TCG)*1	__________	⇨	REGEN
		F3 (RUN)*1	__________	⇨	REC RUN
		F6 (TCR)	__________	⇨	LTC
	Page2	F1 (V. PROC)	__________	⇨	LOCAL
		F2 (VIDEO)	__________	⇨	PRESET
		F3 (CHROMA)	__________	⇨	PRESET
		F4 (HUE)*1	__________	⇨	PRESET
		F5 (SETUP)	__________	⇨	PRESET
		F6 (YC DLY)	__________	⇨	PRESET
	Page4	F1 (CAPSTN)*1	__________	⇨	2FD
		F2 (OUT REF)	__________	⇨	REF
		F4 (CHARA)	__________	⇨	ON

*1: MSW Recorder only

6. **For NTSC model only:**
Set the ITEM-709 and -713 in the setup menu as follows:

ITEM No.	SUB-ITEM	Customer setting		Setting at adjustment
709 : CAV LEVEL FORMAT	1. OUTPUT CAV LEVEL	__________	⇨	B-CAM
713 : VIDEO SETUP REFERENCE LEVEL	0*. MASTER LEVEL	__________	⇨	0.0%
	3. BETACAM PB LEVEL	__________	⇨	MSTER
	4. OUTPUT LEVEL	__________	⇨	MSTER

*: MSW Recorder only

7. Insert the cleaning tape, and press the EJECT and PLAY buttons simultaneously.
   - The EJECT button blinks and the PLAY button light. And the cleaning tape is played for about five seconds, before it is automatically ejected.
8. Warm up the VTR and equipment to be used through the power for 20 minutes or more.

How to Eject the Cassette Tape

Pressing the EJECT button while starting menu A3x or A4x of the maintenance mode will not eject the cassette tape. Eject the following method.

(1) Press the F5 (SET) button once when a direction to eject has appeared.
- A white square appears in the right corner of the superimposed screen of the video monitor to show that the cassette is possible to eject.

(2) Press the EJECT button to eject the cassette tape.

(3) Press the F6 (EXIT) button once.
- The white square on the video monitor will disappear.

Note

In this description it is supplemented as "F5 ⇨ EJECT ⇨ F6".

8-7-3. Initial Data Settings

Notes

- Input the initial data as the adjustment data of the analog Betacam PB system only when the following cases:
  - When the DM-123 board was replaced.
  - When the NV-RAM (IC1805) on the DM-123 board was replaced.
- In this section, expresses the video system as follows:

Model	Standard mode	Alternative mode
NTSC	59.94 Hz or 525	50 Hz or 625
PAL	50 Hz or 625	59.94 Hz or 525

Tool

- Analog composite video monitor

  Note

  Use this video monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

1. Initial Data Settings (Standard Mode)

1. Enter the maintenance mode.
2. Enter A3 : BETACAM PB (DM) and A4 : BETACAM PB (TBC) in order.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM), A4 : BETACAM PB (TBC)
3. When the DM-123 board or NV-RAM (IC1805/DM-123) was replaced only, set the initial data of the sub-menus A31 to A38, and A40 to A42.
   (Refer to the next page.)
4. Enter A3F : NV-RAM CONTROL or A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

   Note

   A3F : NV-RAM CONTROL and A4F : NV-RAM CONTROL are the menus which have the same function.
   Whichever menu is carried out, data can be saved.

5. Exit the maintenance mode.

2. Y TR OFFSET Data Setting (HDW/MSW NTSC model only)

Note

In the case of HDW/MSW NTSC model, switch the operation mode to 50 Hz or 625 mode and set the data of "Y TR OFFSET" as follows. Because "Y TR OFFSET" is displayed only in 50 Hz or 625 mode.

1. Switch the operation mode to the 50 Hz or 625 mode with the setup menu ITEM-013. (Refer to the operation manual.)
2. Enter the maintenance mode.
3. Enter A42 : YC DL/Y TR VR.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A42 : YC DL/Y TR VR
4. Set the following initial data to sub-menu "Y TR OFFSET".

Item (A4 : BETACAM PB (TBC))	Initial data
A42 : YC DL/Y TR VR	
Y TR OFFSET	7F

5. Enter A4F : NV-RAM control, the execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
6. Exit the maintenance mode.
7. Return the operation mode to the 59.94 Hz or 525 with the setup menu ITEM-013.

Initial data (Standard mode)

Item (A3 : BETACAM PB (DM))	Monitor	Menu display	NTSC model in 59.94 Hz, 525	PAL model in 50 Hz, 625
A31 : COS EQ VR (METAL-Y)	EQ1 METAL-Y-A	COS EQ MY - EQ1-MYA	88	90
	EQ1 METAL-Y-B	COS EQ MY - EQ1-MYB	88	90
	MAIN METAL-Y-A	COS EQ MY - MAIN-MYA	A4	8F
	MAIN METAL-Y-B	COS EQ MY - MAIN-MYB	A4	8F
	SUB METAL-Y-A	COS EQ MY - SUB-MYA	80	90
	SUB METAL-Y-B	COS EQ MY - SUB-MYB	80	90
A32 : COS EQ VR (METAL-C)	EQ1 METAL-C-A	COS EQ MC - EQ1-MCA	85	8A
	EQ1 METAL-C-B	COS EQ MC - EQ1-MCB	85	8A
	MAIN METAL-C-A	COS EQ MC - MAIN-MCA	90	97
	MAIN METAL-C-B	COS EQ MC - MAIN-MCB	90	97
	SUB METAL-C-A	COS EQ MC - SUB-MCA	70	97
	SUB METAL-C-B	COS EQ MC - SUB-MCB	70	97
A33 : COS EQ VR (OXIDE-Y)	EQ1 OXIDE-Y-A	COS EQ OY - EQ1-OYA	C8	A5
	EQ1 OXIDE-Y-B	COS EQ OY - EQ1-OYB	C8	A5
	MAIN OXIDE-Y-A	COS EQ OY - MAIN-OYA	B4	B8
	MAIN OXIDE-Y-B	COS EQ OY - MAIN-OYB	B4	B8
	SUB OXIDE-Y-A	COS EQ OY - SUB-OYA	88	AA
	SUB OXIDE-Y-B	COS EQ OY - SUB-OYA	88	AA
A34 : COS EQ VR (OXIDE-C)	EQ1 OXIDE-C-A	COS EQ OC - EQ1-OCA	96	95
	EQ1 OXIDE-C-B	COS EQ OC - EQ1-OCB	96	95
	MAIN OXIDE-C-A	COS EQ OC - MAIN-OCA	A6	A7
	MAIN OXIDE-C-B	COS EQ OC - MAIN-OCB	A6	A7
	SUB OXIDE-C-A	COS EQ OC - SUB-OCA	6E	AD
	SUB OXIDE-C-B	COS EQ OC - SUB-OCB	6E	AD
A35 : G-BAND/OMC DC VR	GUARD BAND METAL-Y	G-BAND - GBAND-MY	20	28
	GUARD BAND METAL-C	G-BAND - GBAND-MC	27	2E
	GUARD BAND OXIDE-Y	G-BAND - GBAND-OY	40	38
	GUARD BAND OXIDE-C	G-BAND - GBAND-OC	3E	3B
	OMC DC METAL-Y	OMC DC - OMC-MY	EB	E7
	OMC DC METAL-C	OMC DC - OMC-MC	D6	D6
	OMC DC OXIDE-Y	OMC DC - OMC-OY	D6	D6
	OMC DC OXIDE-C	OMC DC - OMC-OC	D6	D6
A36 : DO TH/ENV TH VR	DO TH METAL-Y	DO TH - DO TH-MY	18	20
	DO TH METAL-C	DO TH - DO TH-MC	20	25
	DO TH OXIDE-Y	DO TH - DO TH-OY	38	30
	DO TH OXIDE-C	DO TH - DO TH-OC	36	33
	ENV-TH-A	ENV TH - ENV-A	20	20
	ENV-TH-B	ENV TH - ENV-B	20	20

(Continued)

Item (A3 : BETACAM PB (DM))	Monitor	Menu display	NTSC model in 59.94 Hz, 525	PAL model in 50 Hz, 625
A37 : OMC LIM BALANCE VR	OMC LIM METAL-Y-A	OMC L BAL - LIM-MYA	77	78
	OMC LIM METAL-Y-B	OMC L BAL - LIM-MYB	77	78
	OMC LIM METAL-C-A	OMC L BAL - LIM-MCA	54	51
	OMC LIM METAL-C-B	OMC L BAL - LIM-MCB	54	51
	OMC LIM OXIDE-Y-A	OMC L BAL - LIM-OYA	78	78
	OMC LIM OXIDE-Y-B	OMC L BAL - LIM-OYB	78	78
	OMC LIM OXIDE-C-A	OMC L BAL - LIM-OCA	55	55
	OMC LIM OXIDE-C-B	OMC L BAL - LIM-OCB	55	55
A38 : DEMO BAL/ETC. VR	DEMO BAL METAL-Y	DEMO BAL - DM BL-MY	83	80
	DEMO BAL METAL-C	DEMO BAL - DM BL-MC	83	80
	DEMO BAL OXIDE-Y	DEMO BAL - DM BL-OY	83	83
	DEMO BAL OXIDE-C	DEMO BAL - DM BL-OC	83	83
	VAR DEEMP-Y	VAR DEEMP - DEEMP-Y	90	80
	VAR DEEMP-C	VAR DEEMP - DEEMP-C	40	3E
	SV TAPE SPD OFFSET	SV SPEED - TAPE SPD	62	60
	GAUSS LEVEL [*1]	GAUSS LVL- GAUSS [*1]	B6	6A

*1 : This menu is displayed for MSW-M series.

Item (A4 : BETACAM PB (TBC))	Monitor	Menu display	NTSC model in 59.94 Hz, 525	PAL model in 50 Hz, 625
A40 : TBC IC DATA	SQ-Y RZ	TBC DATA - SQ-Y RZ	46	45
	SQ-C RZ	TBC DATA - SQ-C RZ	6B	6A
	VISC PHASE	TBC DATA - VISC	02	04
A41 : LVL/IMP/PHASE VR	AD LEVEL METAL-Y	AD LEVEL - LEVEL-MY	8A	99
	AD LEVEL METAL-C	AD LEVEL - LEVEL-MC	60	A0
	AD LEVEL OXIDE-Y	AD LEVEL - LEVEL-OY	8A	9C
	AD LEVEL OXIDE-C	AD LEVEL - LEVEL-OC	60	9C
	IMP OFFSET-Y	IMP ERR - IMP Y	7E	7E
	IMP OFFSET-C	IMP ERR - IMP C	7E	7E
	VIDEO PH	PHASE - VIDEO PH	80	80
	VISC PH	PHASE - VISC PH	96	80
NTSC model:	Y/C DELAY M-A	Y/C DELAY - Y/C MA	60	80
A42 : YC DL VR	Y/C DELAY M-B	Y/C DELAY - Y/C MB	60	80
PAL model:	Y/C DELAY O-A	Y/C DELAY - Y/C OA	90	A0
A42 : YC DL/Y TR VR	Y/C DELAY O-B	Y/C DELAY - Y/C OB	90	A0
	Y TR OFFSET [*2]	TR OFFSET - Y TR [*2]	A0 [*2]	7F

*2 : This menu is displayed only in 50 Hz or 625 mode.
For HDW/MSW NTSC model, be sure to set this data in 50 Hz or 625 mode.

8-7-4. EQ RF Output Level Adjustment

Adjust the EQ RF output level referring to "8-4-3. Betacam / Betacam SP Format PB System (EQ RF Output Level) Adjustment".

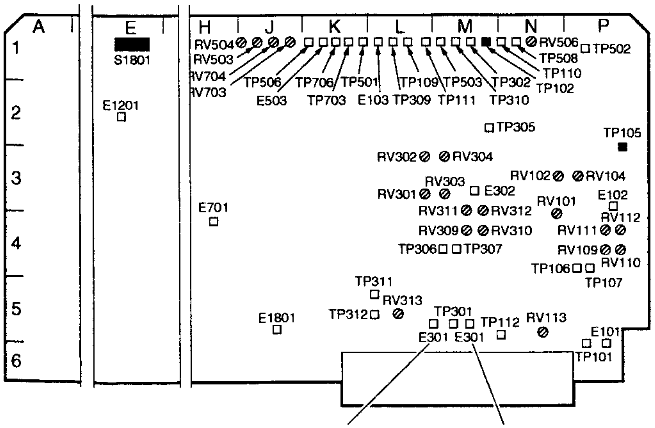
8-7-5. Cosine Equalizer Adjustment

Note

If the network analyzer is not available, perform "8-7-6. Cosine Equalizer Provisional Adjustment".

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Network analyzer: Anritsu MS420B or equivalent
- Analog composite video monitor
- Extension board: EX-739
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS
- Shorting clip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TP301
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(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

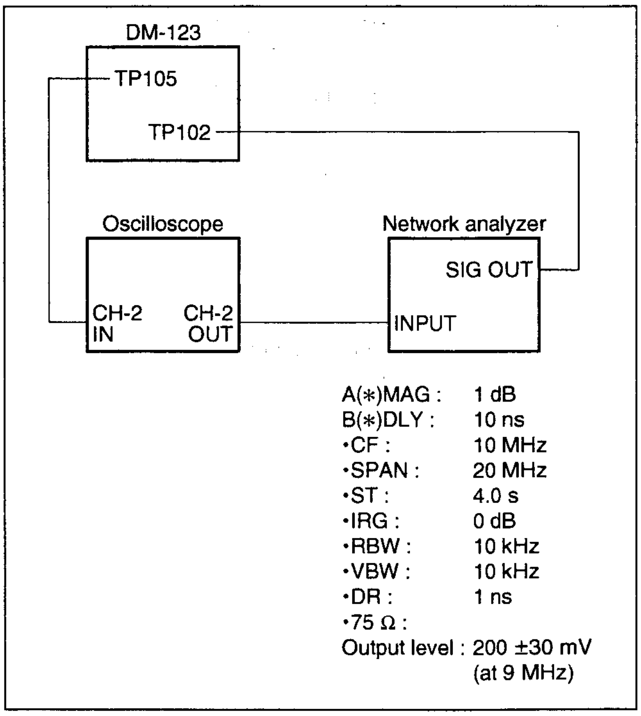
Preparation

1. **Turn the power off, then extend the DM-123 board with an extension board EX-739.**

2. **Set the following switches on the DM-123 board.**
   S1801(E-1): Bit-5 (AGC OFF) ⇨ ON
   Bit-6 (DO ADJ) ⇨ ON

3. **Check the settings for adjustment.**
   Check that switches (other than S1801/DM-123 described above) and menu are set to the factory settings. (Refer to "8-7-2. Common Preparation".)

4. **Connect the equipment.**
   Connect the oscilloscope and network analyzer. (Refer to Figure "Connection and Setting of Network Analyzer".)


DM-123
TP105
TP102
Oscilloscope
CH-2 IN
CH-2 OUT
Network analyzer
SIG OUT
INPUT

A(*)MAG : 1 dB
B(*)DLY : 10 ns
•CF : 10 MHz
•SPAN : 20 MHz
•ST : 4.0 s
•IRG : 0 dB
•RBW : 10 kHz
•VBW : 10 kHz
•DR : 1 ns
•75 Ω :
Output level : 200 ±30 mV (at 9 MHz)

Connection and Setting of Network Analyzer

5. **Check that the equipment has warmed up.**
   Before starting the adjustment, warm up the VTR and other equipment through the power for 20 minutes or more.

1. Enter the Maintenance Mode and Check the Initial Data.

1. Enter the maintenance mode.
2. Enter A35 : G-BAND/OMC DC VR.
   Maintenance mode → M1 : ADJUST → A3 : BETA-CAM PB (DM) → A35 : G-BAND/OMC DC VR
   Ensure that the data of the following items in A35 : G-BAND/OMC DC VR are the specified data value.
   (This is OMC DC offset setting data check.)

Item (A35 : G-BAND/OMC DC VR)	Setting data NTSC model in 59.94/525	PAL model in 50/625
OMC DC METAL-Y	EB	E7
OMC DC METAL-C	D6	D6
OMC DC OXIDE-Y	D6	D6
OMC DC OXIDE-C	D6	D6

3. To exit A35 : G-BAND/OMC DC VR, press the F6 (EXIT) button once.

The following step 4 is required only when the DM-123 board or NV-RAM (IC1805/DM-123) was replaced.

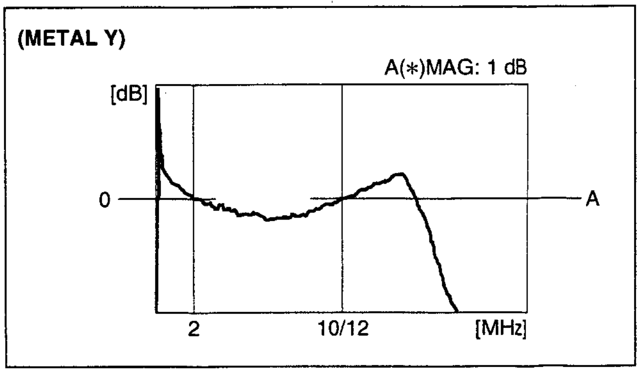
4. Check that the specified initial data are set for the following items. (Refer to Section 8-7-3.)
   - A31 : COS EQ VR (METAL-Y)
   - A32 : COS EQ VR (METAL-C)
   - A33 : COS EQ VR (OXIDE-Y)
   - A34 : COS EQ VR (OXIDE-C)

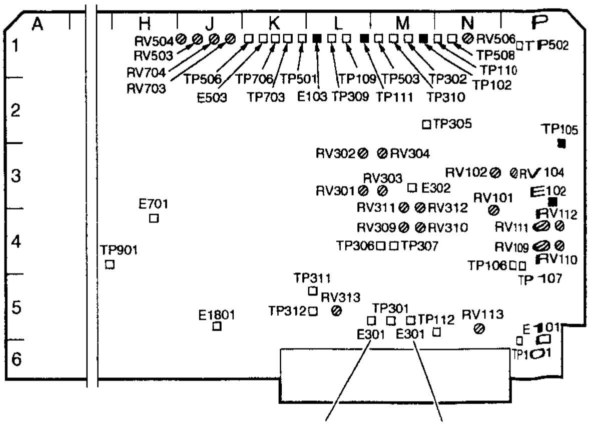
2. METAL Y Adjustment

1. Short-circuit TP111/DM-123(L-1) and E103/DM-123(L-1) with a shorting clip.
2. Connect the network analyzer's output to TP102/DM-123(M-1). GND: E103/DM-123(L-1)
3. Insert the following alignment tape in order to set PLAY mode.
   NTSC model: CR5-1B
   PAL model: CR5-1B PS

Group delay adjustment / METAL Y

4. Connect the oscilloscope's CH-2 input to TP105/DM-123(P-2). GND: E102/DM-123(P-3)
5. Enter A31 : COS EQ VR (METAL-Y).
6. Roughly adjust the level at 10/12 MHz using 2 MHz as the reference.
   For NTSC model: at 10 MHz
   For PAL model: at 12 MHz
   Adj. point: A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   Specification: A = 0 ±0.5 dB

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TP112
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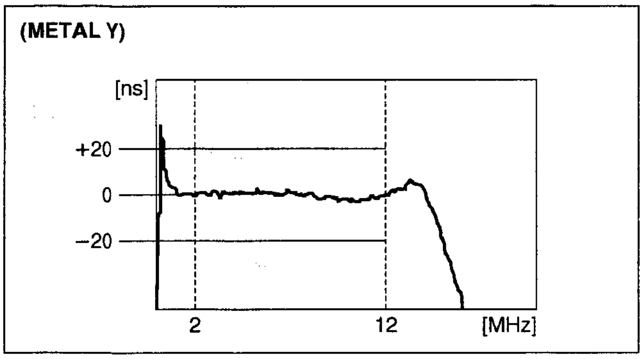
TP101

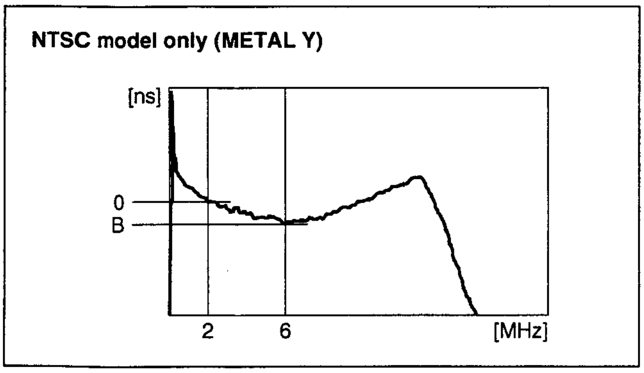
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

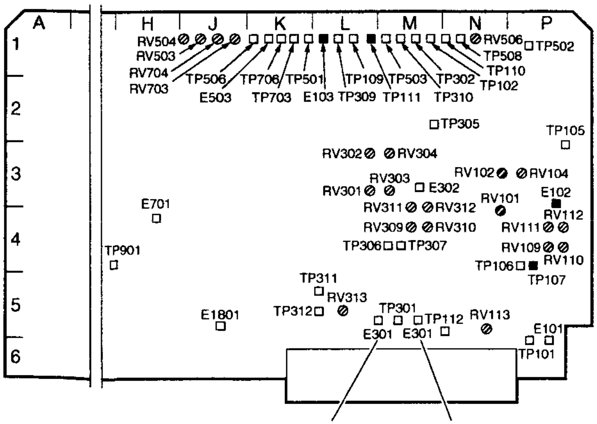
DM-123 Board (Side A)

7. Adjust the group delay time in 2 MHz through 12 MHz.
   Adj. points: ⊘RV101/DM-123(N-3) and
   ⊘RV102/DM-123(N-3)
   Specification: 0 ±20 ns



8. **For NTSC model only:**
   Adjust each delay times at 6 MHz using 2 MHz as the reference.
   Adj. points: ⊘RV101/DM-123(N-3)
   Specifications: B = −20 ±5 ns

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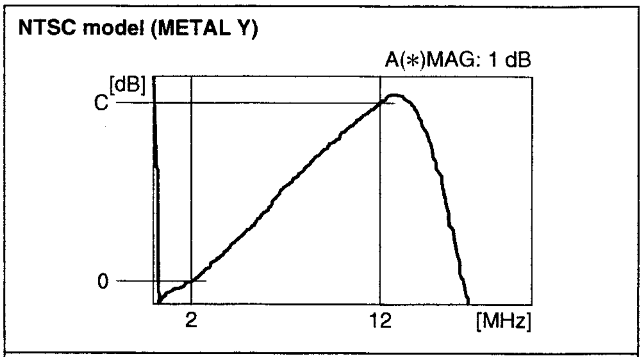
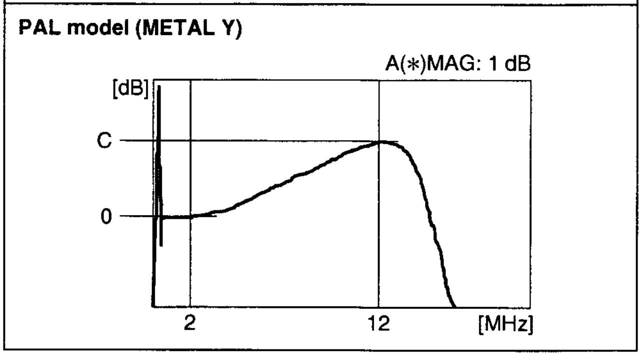
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

Main adjustment / METAL Y

9. Connect the oscilloscope's CH-2 input to TP107/DM-123(P-4). GND: E102/DM-123(P-3)
10. Adjust the level at 12 MHz using 2 MHz as the reference.
    Adj. point: A31 : COS EQ VR (METAL-Y) :
    MAIN METAL-Y-A
    Specification: NTSC model: C = +2.0 ±0.5 dB
    PAL model: C = +1.5 ±0.5 dB





11. Set the data of "MAIN METAL-Y-B" in A31 : COS EQ VR (METAL-Y) to the identical data value as "MAIN METAL-Y-A".

Sub adjustment / METAL Y

12. Ensure that the data of "SUB METAL-Y-A" and "SUB METAL-Y-B" in A31 : COS EQ VR (METAL-Y) are the following data.
    For NTSC model: 80
    For PAL model: 90
13. Reset the A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A data value to the initial value.
14. To exit A31 : COS EQ VR (METAL-Y), press the F6 (EXIT) button once.
15. Remove the shorting clip between TP111/DM-123(L-1) and E103/DM-123(L-1).

3. METAL C Adjustment

1. Short-circuit TP311/DM-123(L-5) and E301/DM-123(L-5) with a shorting clip.
2. Connect the network analyzer's output to TP302/DM-123(M-1). GND: E103/DM-123(L-1)

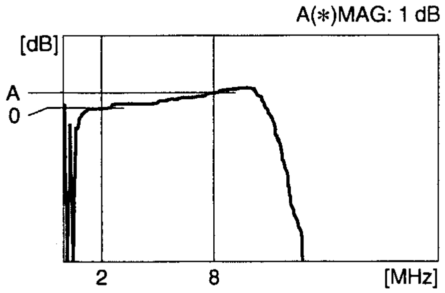
Note

The alignment tape (CR5-1B / CR5-1B PS) is still in the VTR. (PLAY mode)

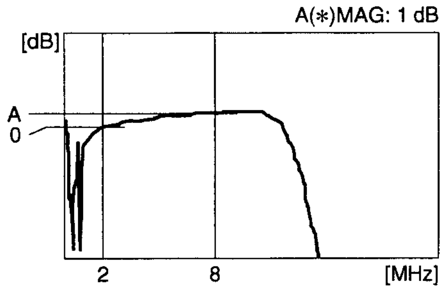
Group delay adjustment / METAL C

3. Connect the oscilloscope's CH-2 input to TP305/DM-123(M-2). GND: E302/DM-123(M-3)
4. Enter A32: COS EQ VR (METAL-C).
5. Roughly adjust the level at 8 MHz using 2 MHz as the reference.
   Adj. point: A32 : COS EQ VR (METAL-C) :
   EQ1 METAL-C-A
   Specification: A = 0 ±0.5 dB

NTSC model (METAL C)

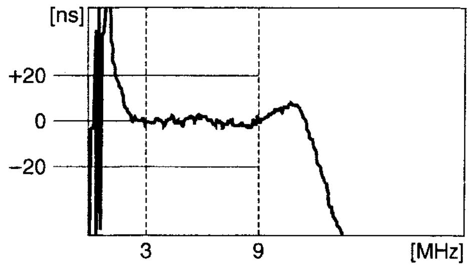


PAL model (METAL C)

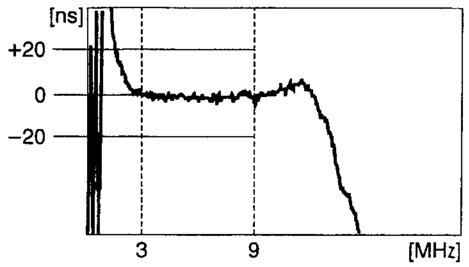


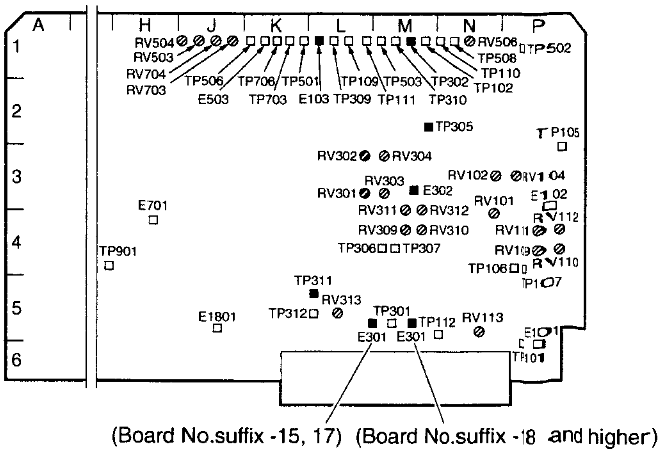
6. Adjust the group delay time in 3 MHz through 9 MHz.
   Adj. points: ⊘RV301/DM-123(L-3) and
   ⊘RV302/DM-123(L-2)
   Specification: 0 ±20 ns

NTSC model (METAL C)



PAL model (METAL C)

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(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

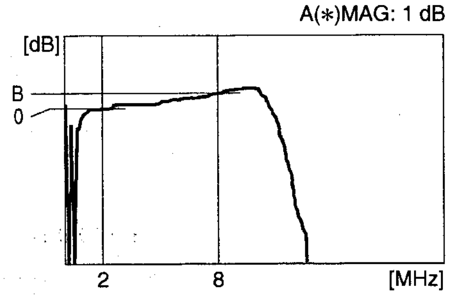
Main adjustment / METAL C

7. Connect the oscilloscope's CH-2 input to TP307/DM-123(M-4). GND: E302/DM-123(M-3)
8. Adjust the level at 8 MHz using 2 MHz as the reference.

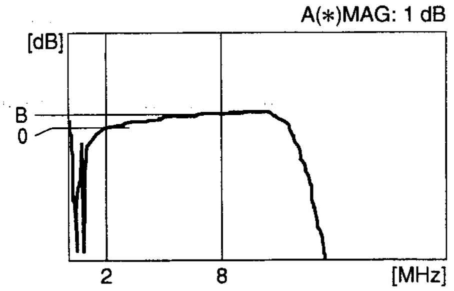
   Adj. point: A32 : COS EQ VR (METAL-C) :
   MAIN METAL-C-A

   Specification: B = +0.5 ±0.5 dB

NTSC model (METAL C)



PAL model (METAL C)



9. Set the data of "MAIN METAL-C-B" in A32 : COS EQ VR (METAL-C) to the identical data value as "MAIN METAL-C-A".

Sub adjustment / METAL C

10. **For NTSC model:**

    Ensure that the data of "SUB METAL-C-A" and "SUB METAL-C-B" in A32 : COS EQ VR (METAL-C) are 70.

    For PAL model:

    (1) Connect the oscilloscope's CH-2 input to TP306/DM-123(M-4). GND: E302/DM-123(M-3)

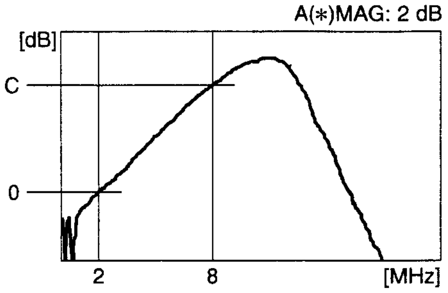
    (2) Adjust the level at 8 MHz using 2 MHz as the reference.

    Adj. point: A32 : COS EQ VR (METAL-C) :
    SUB METAL-C-A

    Specification: C = +9.2 ± 1.0 dB

    (3) Set the data of "SUB METAL-C-B" in A32 : COS EQ VR (METAL-C) to the identical data value as "SUB METAL-C-A".

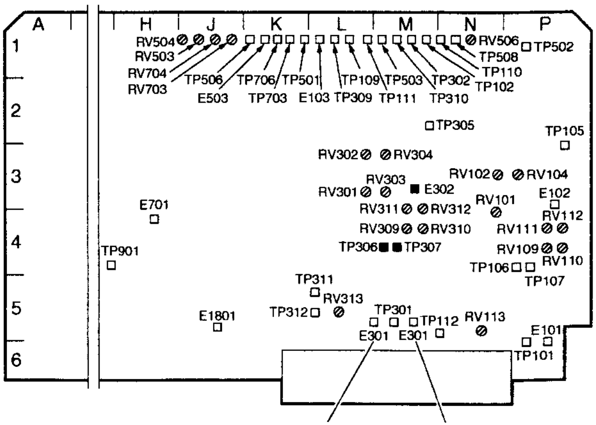
PAL model only (METAL C)



11. Reset the "EQ1 METAL-C-A" in A32 : COS EQ VR (METAL-C) data value to the following initial value.

    NTSC model: 80

    PAL model: 75
12. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)
13. To exit A32 : COS EQ VR (METAL-C), press the F6 (EXIT) button once.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(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

4. OXIDE C Adjustment

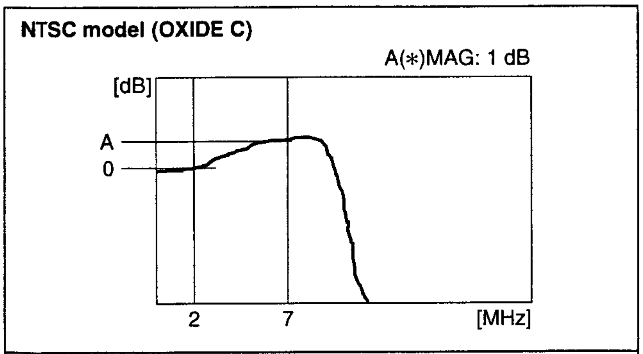
1. Insert the following alignment tape in order to set PLAY mode.
   NTSC model: CR5-2A
   PAL model: CR5-2A PS

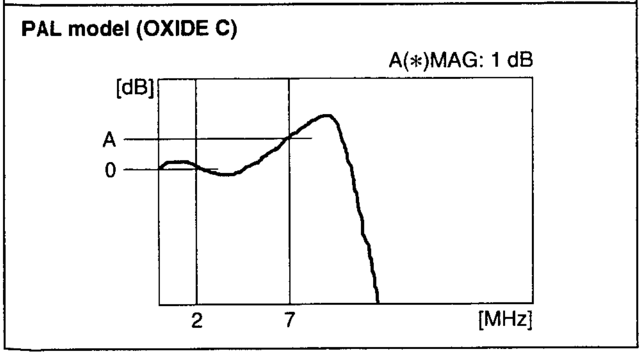
Notes

- Shorting clip remains short-circuit between TP311/DM-123(L-5) and E301/DM-123(L-5).
- The network analyzer's output is in connection to TP302/DM-123(M-1). GND: E103/DM-123(L-1)

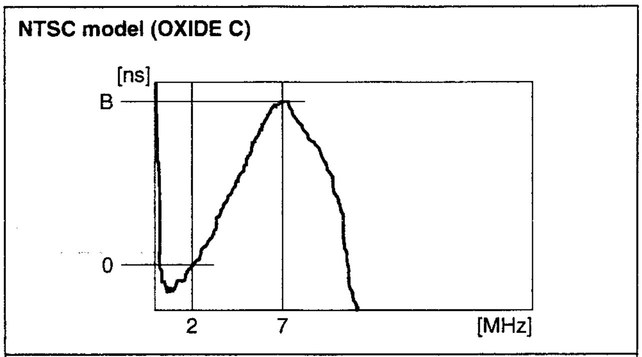
Group delay adjustment / OXIDE C

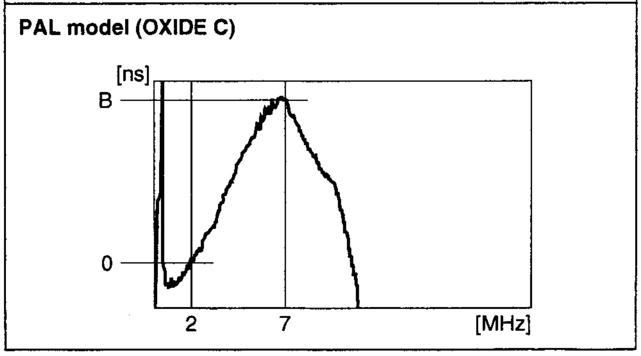
2. Connect the oscilloscope's CH-2 input to TP305/DM-123(M-2). GND: E302/DM-123(M-3)
3. Enter A34: COS EQ VR (OXIDE-C).
4. Roughly adjust the level at 7 MHz using 2 MHz as the reference.
   Adj. point: A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A
   Specification: A = +2.3 ±0.5 dB

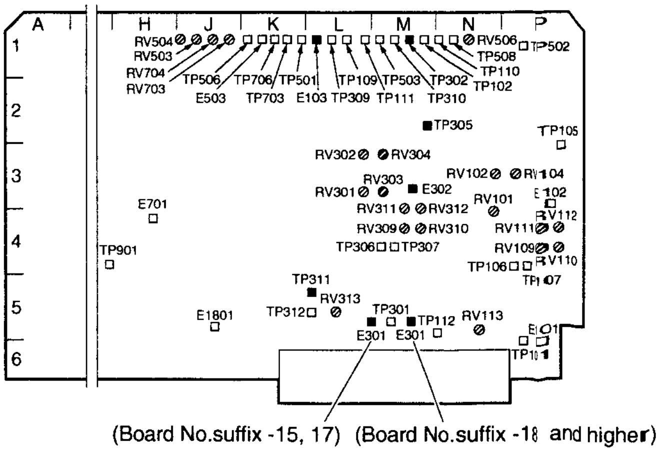

NTSC model (OXIDE C)


PAL model (OXIDE C)

5. Adjust the delay time at 7 MHz using 2 MHz as the reference.
   Adj. points: ⊘RV303/DM-123(M-3) and ⊘RV304/DM-123(M-2)
   Specification: B = 70 ±5 ns


NTSC model (OXIDE C)


PAL model (OXIDE C)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(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

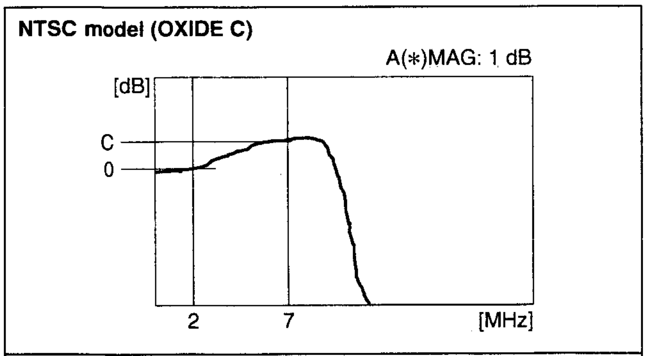
DM-123 Board (Side A)

Main adjustment / OXIDE C

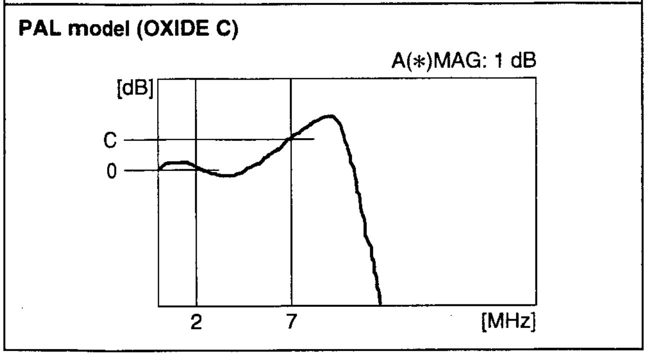
6. Connect the oscilloscope's CH-2 input to TP307/DM-123(M-4). GND: E302/DM-123(M-3)
7. Adjust the level at 7 MHz using 2 MHz as the reference.

   Adj. point: A34 : COS EQ VR (OXIDE-C) : MAIN OXIDE-C-A

   Specification: C = +3.5 ±0.5 dB



NTSC model (OXIDE C)



PAL model (OXIDE C)

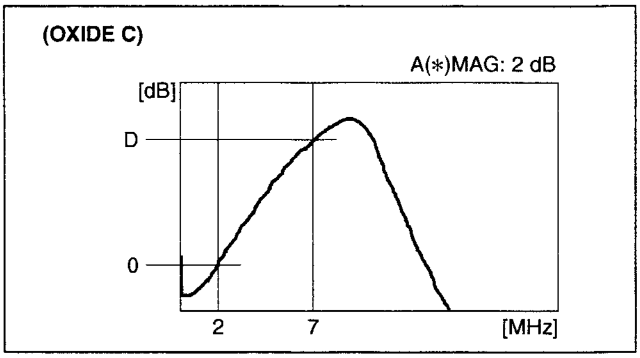
8. Set the data of "MAIN OXIDE-C-B" in A34 : COS EQ VR (OXIDE-C) to the identical data value as "MAIN OXIDE-C-A".

Sub adjustment / OXIDE C

9. Connect the oscilloscope's CH-2 input to TP306/DM-123(M-4). GND: E302/DM-123(M-3)
10. Adjust the level at 7 MHz using 2 MHz as the reference.

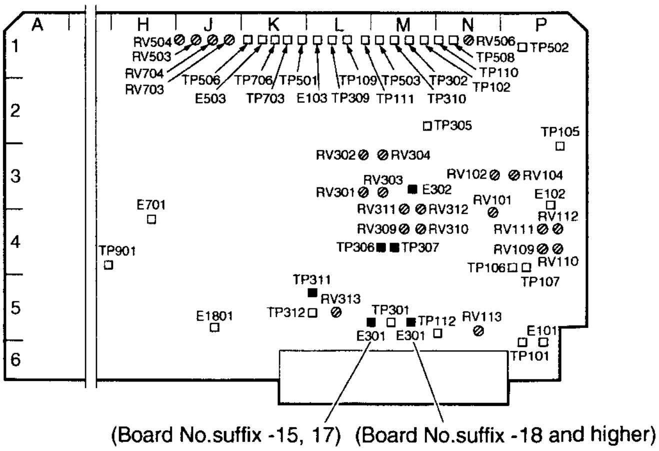
    Adj. point: A34 : COS EQ VR (OXIDE-C) : SUB OXIDE-C-A

    Specification: D = +13.0 ±0.5 dB



(OXIDE C)

11. Set the data of "SUB OXIDE-C-B" in A34 : COS EQ VR (OXIDE-C) to the identical data value as "SUB OXIDE-C-A".
12. Reset the "EQ1 OXIDE-C-A" in A34 : COS EQ VR (OXIDE-C) data value to the initial value 90.
13. To exit A34 : COS EQ VR (OXIDE-C), press the F6 (EXIT) button once.
14. Remove the shorting clip between TP311/DM-123(L-5) and E301/DM-123(L-5).



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(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

5. OXIDE Y Adjustment

1. Short-circuit TP111/DM-123(L-1) and E103/DM-123(L-1) with a shorting clip.
2. Connect the network analyzer's output to TP102/DM-123(M-1). GND: E103/DM-123(L-1)

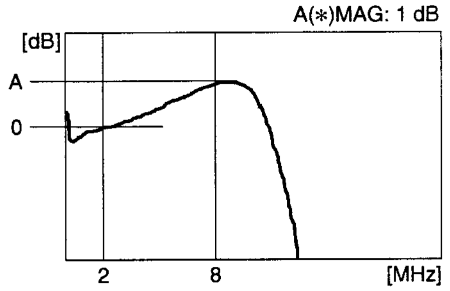
Note

The alignment tape (CR5-2A/ CR5-2A PS) is still in the VTR. (PLAY mode)

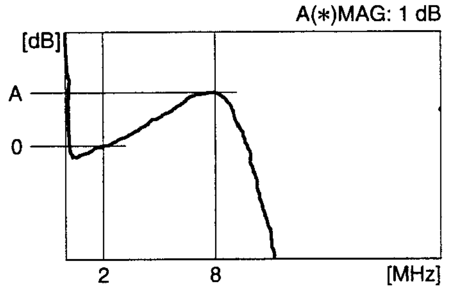
Group delay adjustment / OXIDE Y

3. Connect the oscilloscope's CH-2 input to TP105/DM-123(P-2). GND: E102/DM-123(P-3)
4. Enter A33 : COS EQ VR (OXIDE-Y).
5. Roughly adjust the level at 8 MHz using 2 MHz as the reference.
   Adj. point: A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A
   Specification: A = +6.0 ±0.5 dB

NTSC model (OXIDE Y)

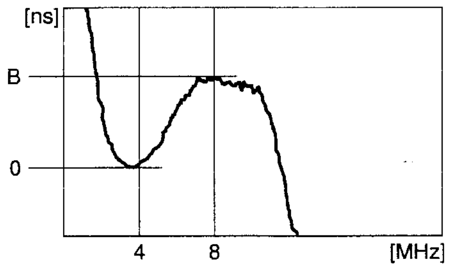


PAL model (OXIDE Y)

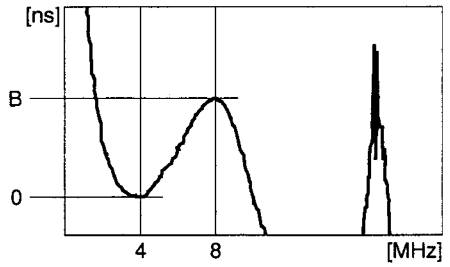


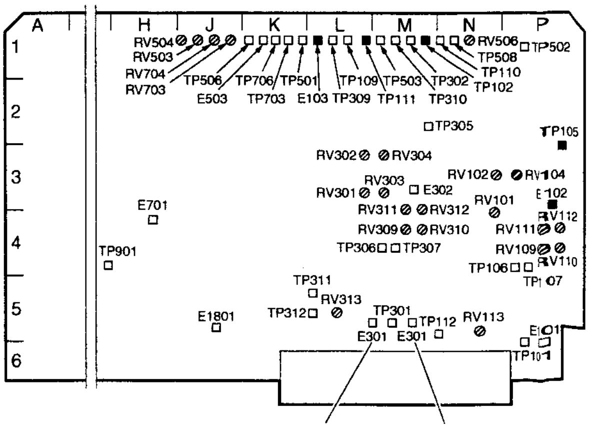
6. Adjust the delay time at 8 MHz using 4 MHz as the reference.
   Adj. point: ⊘RV104/DM-123(P-3)
   Specification: B = 45 ±5 ns

NTSC model (OXIDE Y)



PAL model (OXIDE Y)




A
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4
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6
RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP310
TP302
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV311
RV312
RV112
E701
RV309
RV310
RV111
TP901
TP306
TP307
RV109
TP106
RV110
TP107
TP311
RV313
E1801
TP312
TP301
TP112
RV113
E301
E301
E101
TP101

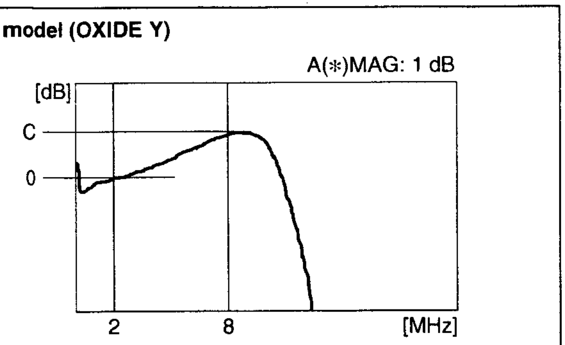
(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

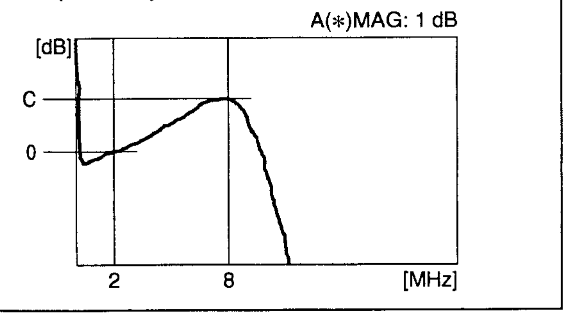
Main adjustment / OXIDE Y

7. Connect the oscilloscope's CH-2 input to TP107/DM-123(P-4). GND: E102/DM-123(P-4)
8. Adjust the level at 8 MHz using 2 MHz as the reference.
   Adj. point: A33 : COS EQ VR (OXIDE-Y) :
   MAIN OXIDE-Y-A
   Specification: C = +8.0 ±0.5 dB

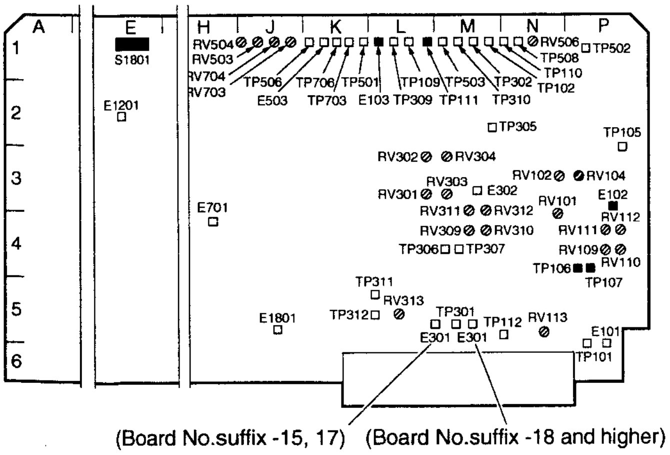
NTSC model (OXIDE Y)



PAL model (OXIDE Y)



9. Set the data of "MAIN OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) to the identical data value as "MAIN OXIDE-Y-A".

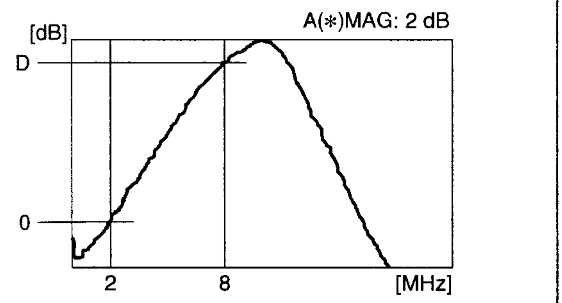

A
E
H
J
K
L
M
N
P
1
2
3
4
5
6
S1801
E1201
E701
E1801
RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP302
TP310
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
TP106
RV110
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

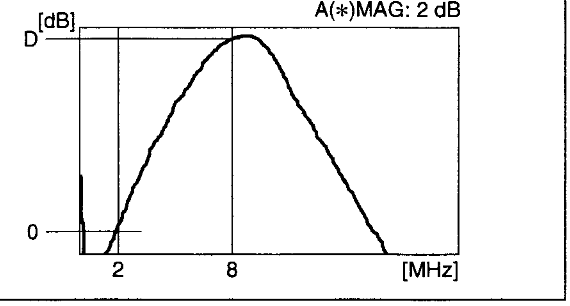
Sub adjustment / OXIDE Y

10. Connect the oscilloscope's CH-2 input to TP106/DM-123(P-4). GND: E102/DM-123(P-3)
11. Adjust the level at 8 MHz using 2 MHz as the reference.
    Adj. point: A33 : COS EQ VR (OXIDE-Y) :
    SUB OXIDE-Y-A
    Specification: D = +20.0 ±1.0 dB

NTSC model (OXIDE Y)



PAL model (OXIDE Y)



12. Set the data of "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) to the identical data value as "SUB OXIDE-Y-A".
13. Reset the "EQ1 OXIDE-Y-A" in A34 : COS EQ VR (OXIDE-Y) data value to the initial value A0.
14. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)
15. To exit A33 : COS EQ VR (OXIDE-Y), press the F6 (EXIT) button once.
16. Remove the shorting clip between TP111/DM-123(L-1) and E103/DM-123(L-1).
17. Reset the switches Bit-5 and Bit-6 of S1801/DM-123 (E-1) to OFF (down side).

---

6. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
2. Exit the maintenance mode.

8-7-6. Cosine Equalizer Provisional Adjustment

Notes

- This provisional adjustment explains how to adjust without using the network analyzer.
  If "8-7-5. Cosine Equalizer Adjustment" is performed using the network analyzer, this provisional adjustment is not required.
- Perform this provisional adjustment only when the network analyzer is not available for an urgent repair. At a later date, be sure to perform "8-7-5. Cosine Equalizer Adjustment" using the network analyzer.

Tool

- Analog composite video monitor

(A3 : BETACAM PB (DM)) Sub-menu	Item	Setting data NTSC model in 59.94/525	PAL model in 50/625
A31 : COS EQ VR (METAL-Y)	EQ1 METAL-Y-A	88	90
	EQ1 METAL-Y-B	88	90
A32 : COS EQ VR (METAL-C)	EQ1 METAL-C-A	85	8A
	EQ1 METAL-C-B	85	8A
A33 : COS EQ VR (OXIDE-Y)	EQ1 OXIDE-Y-A	C8	A5
	EQ1 OXIDE-Y-B	C8	A5
A34 : COS EQ VR (OXIDE-C)	EQ1 OXIDE-C-A	96	95
	EQ1 OXIDE-C-B	96	95

Settings of Adjustment Data (Check)

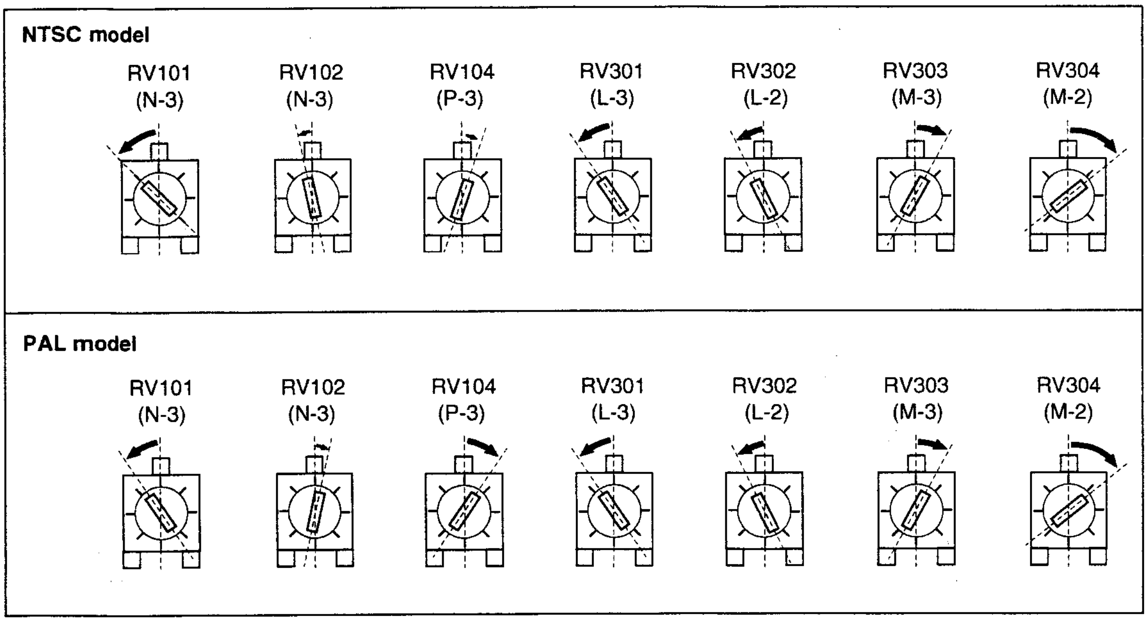
1. Enter the maintenance mode.
2. Set the specified data value to each item of the following sub-menus A31 to A34 in A3 : BETACAM PB (DM).

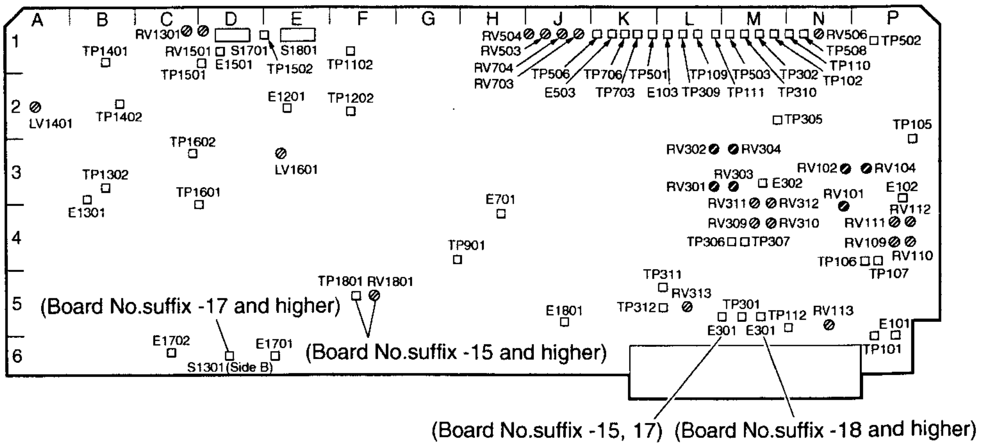
(A3 : BETACAM PB (DM)) Sub-menu	Item	Setting data NTSC model in 59.94/525	PAL model in 50/625
A31 : COS EQ VR (METAL-Y)	MAIN METAL-Y-A	A4	8F
	MAIN METAL-Y-B	A4	8F
	SUB METAL-Y-A	80	90
	SUB METAL-Y-B	80	90
A32 : COS EQ VR (METAL-C)	MAIN METAL-C-A	90	97
	MAIN METAL-C-B	90	97
	SUB METAL-C-A	70	97
	SUB METAL-C-B	70	97
A33 : COS EQ VR (OXIDE-Y)	MAIN OXIDE-Y-A	B4	B8
	MAIN OXIDE-Y-B	B4	B8
	SUB OXIDE-Y-A	88	AA
	SUB OXIDE-Y-B	88	AA
A34 : COS EQ VR (OXIDE-C)	MAIN OXIDE-C-A	A6	A7
	MAIN OXIDE-C-B	A6	A7
	SUB OXIDE-C-A	6E	AD
	SUB OXIDE-C-B	6E	AD

3. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
4. Exit the maintenance mode.

Settings of RVs

Set the following RVs on the DM-123 board to each specified position as shown figure below.


NTSC model
RV101 (N-3)
RV102 (N-3)
RV104 (P-3)
RV301 (L-3)
RV302 (L-2)
RV303 (M-3)
RV304 (M-2)
PAL model
RV101 (N-3)
RV102 (N-3)
RV104 (P-3)
RV301 (L-3)
RV302 (L-2)
RV303 (M-3)
RV304 (M-2)


A B C D E F G H J K L M N P
1 2 3 4 5 6
RV1301
RV1501
S1701
S1801
TP1401
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
E701
TP901
TP1801 RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
(Board No.suffix -15 and higher)
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
E503
TP703
E103
TP309
TP111
TP310
RV506
TP502
TP508
TP110
TP102
TP305
TP105
RV302
RV304
RV303
RV102
RV104
RV301
E302
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
TP106
RV110
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-7. DM RF Output Level Adjustment

Tools

• Oscilloscope:	Tektronix TDS460A or equivalent
• Extension board:	EX-739
For NTSC model:	CR5-1B and CR5-2A
For PAL model:	CR5-1B PS and CR5-2A PS

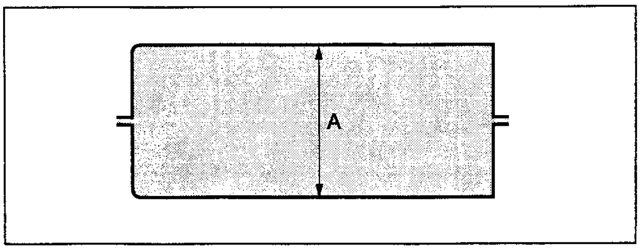
Preparation

1. Conditions to be kept are:

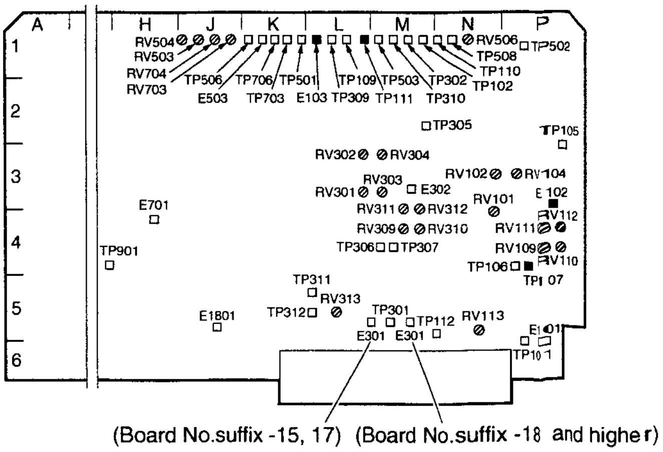
- Extension of DM-123 board.
- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

1. OXIDE Y Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP107/DM-123(P-4), AC 100 mV/DIV
   GND: E102/DM-123(P-3)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 2 ms/DIV
   TRIG: CH-2, – slope
2. Play back the alignment tape in PLAY mode, then adjust the level at the middle of V period.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: ⊘RV112/DM-123(P-4)
   Specification: A = 400 ±40 mV p-p



3. Stop the playback of the alignment tape.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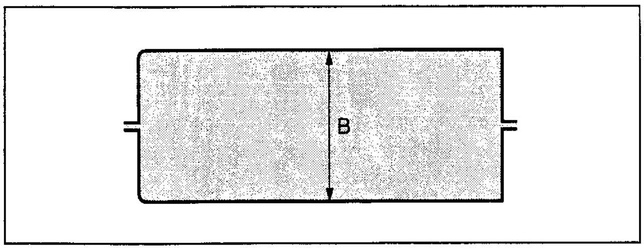
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
TP102
E503
TP703
E103
TP309
TP111
TP310
RV506
TP502
TP508
TP110
TP305
TP105
RV302
RV304
RV303
RV102
RV104
RV301
E302
RV101
E102
E701
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
TP901
TP106
RV110
TP107
TP311
RV313
E1801
TP312
TP301
TP112
RV113
E101
E301
E301
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

2. OXIDE C Adjustment

1. Change the connection of the oscilloscope's CH-1 as follows:
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH-2.)
   CH-1: TP307/DM-123(M-4),
   GND: E302/DM-123(M-3)
2. Play back the alignment tape in PLAY mode, then adjust the level at the middle of V period.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: ⊘RV312/DM-123(M-3)
   Specification: B = 400 ±40 mV p-p



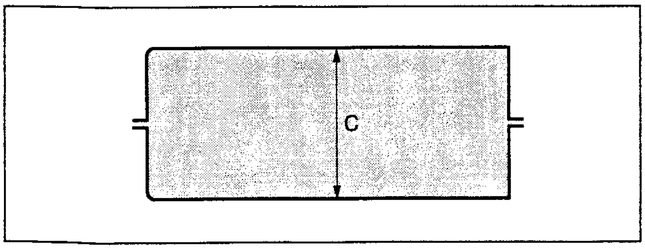
3. Eject the alignment tape.

3. METAL C Adjustment

Note

Connection of the oscilloscope remains unchanged.

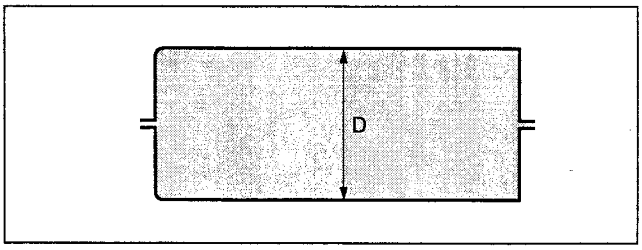
1. Play back the alignment in PLAY mode, then adjust the level at the middle of V period.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV311/DM-123(M-3)
   Specification: C = 400 ±40 mV p-p



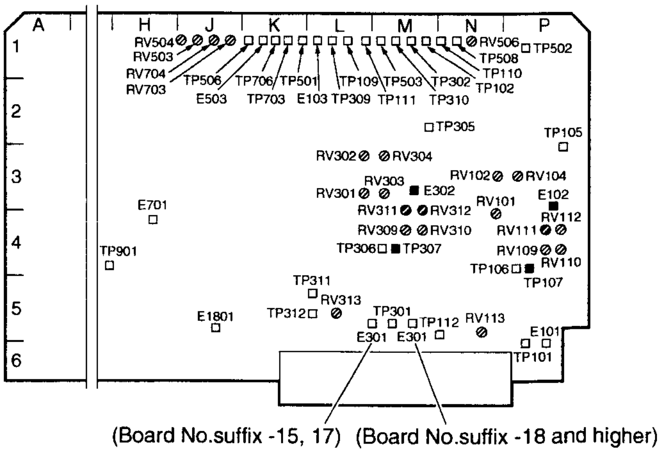
2. Stop the playback of the alignment tape.

4. METAL Y Adjustment

1. Change the connection of the oscilloscope's CH1 as follows:
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH2.)
   CH-1: TP107/DM-123(P-4)
   GND: E102/DM-123(P-3)
2. Play back the alignment tape in PLAY mode, then adjust the level at the middle of V period.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV111/DM-123(P-4)
   Specification: D = 400 ±40 mV p-p



3. Stop the playback of the alignment tape.


A
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RV504
RV503
RV704
RV703
TP506
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TP706
TP703
TP501
E103
TP109
TP309
TP503
TP111
TP302
TP310
RV506
TP508
TP110
TP102
TP502
TP305
TP105
RV302
RV304
RV303
RV301
E302
RV102
RV104
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
RV110
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-8. GAUSS Control Level Adjustment

Notes

- Models to be adjusted: HDW-M series
  DVW series
  MSW-M series

- Perform this adjustment after completing "8-4-3. Betacam / Betacam SP Format PB System (EQ RF Output Level) Adjustment".

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS

Preparation

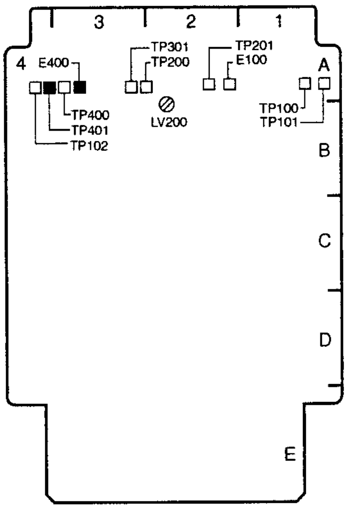
1. Stop extending of the DM-123 board.

Note

Before removing the boards, turn off the power.

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more.



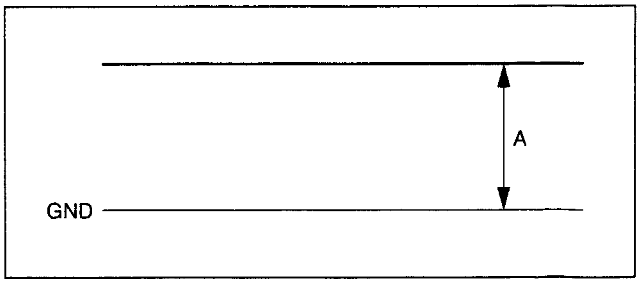
TC-104 Board (Side A)

Adjustment

1. Enter the maintenance mode.
2. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A38 : DEMO BAL/ETC. VR
3. Check that the specified initial data is set for the following item.

Item (A38 : DEMO BAL/ETC.VR)	Initial data
GAUSS LEVEL	B6

4. Connect and set the oscilloscope as follows:
   CH-1: TP401/TC-104(A-4), DC 50 mV/DIV
   GND: E400/TC-104(A-3)
   TIME: 10 μs/DIV
5. Play back the alignment tape in PLAY mode, then adjust the level.
   PB portion: 75 % color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Adj. points: A38 : DEMO BAL/ETC. VR : GAUSS LEVEL
   Specification: A = 180 ± 10 mV dc



6. Stop the playback of the alignment tape.
   Note
   It is not necessary to eject the alignment tape when perform subsequent "8-7-9. OMC Carrier Balance Adjustment".
7. To exit A38 : DEMO BAL/ETC. VR, press the F6 (EXIT) button once.
8. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
9. Exit the maintenance mode.

8-7-9. OMC Carrier Balance Adjustment

Note

If the network analyzer is not available, perform "8-7-10. OMC Carrier Balance Provisional Adjustment".

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Spectrum analyzer:
  Advantest R3261A or equivalent
- Analog composite video monitor
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS
- Shorting clip

Preparation

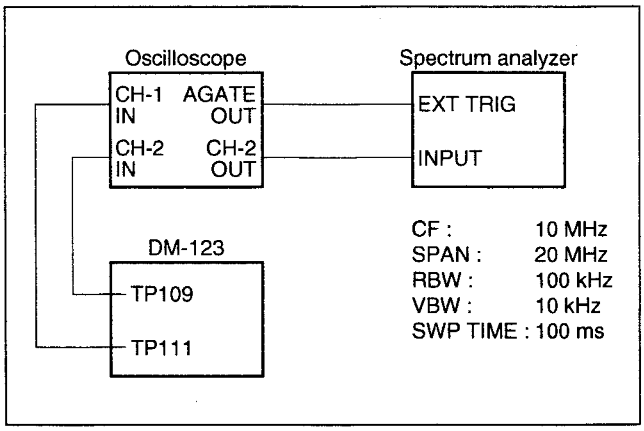
1. Stop extending of the DM-123 board.

Note

Before removing the board, turn off the power.

2. Connect the equipment.

Connect the oscilloscope and spectrum analyzer.


Oscilloscope
CH-1 IN
AGATE OUT
CH-2 IN
CH-2 OUT
Spectrum analyzer
EXT TRIG
INPUT
DM-123
TP109
TP111
CF : 10 MHz
SPAN : 20 MHz
RBW : 100 kHz
VBW : 10 kHz
SWP TIME : 100 ms

Connection and Setting of Spectrum Analyzer

3. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

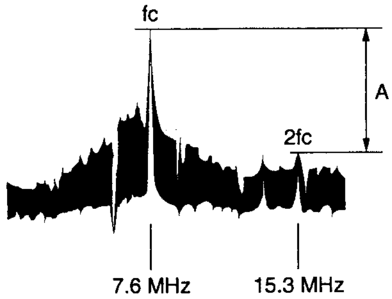
1. Enter the Maintenance Mode.

1. Enter the maintenance mode.
2. Enter A37 : OMC LIM BALANCE VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A37 : OMC LIM BALANCE VR

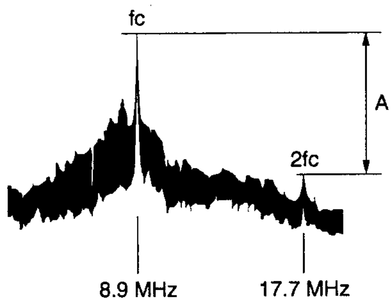
2. METAL Y Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   CH-2: TP109/DM-123(L-1), AC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 5 ms/DIV
   TRIG: CH-1, − slope
2. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM METAL-Y-A and OMC LIM METAL-Y-B
   Specification: A ≧ 40 dB

NTSC model (METAL Y)



PAL model (METAL Y)

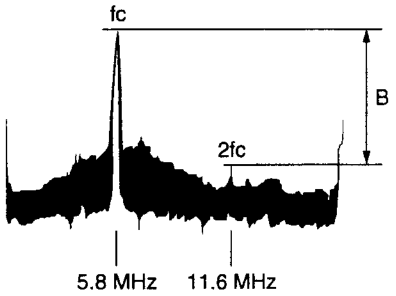


3. Stop the playback of the alignment tape.

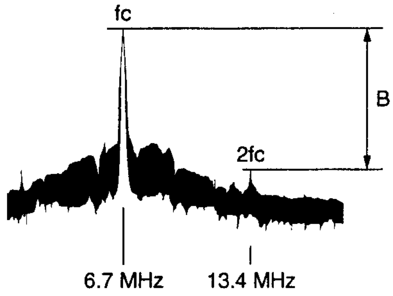
3. METAL C Adjustment

1. Change the connection of the oscilloscope's CH-2 as follows:
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH-1.)
   CH-2: TP309/DM-123(L-1),
   GND: E103/DM-123(L-1)
2. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM METAL-C-A and OMC LIM METAL-C-B
   Specification: B ≧ 40 dB

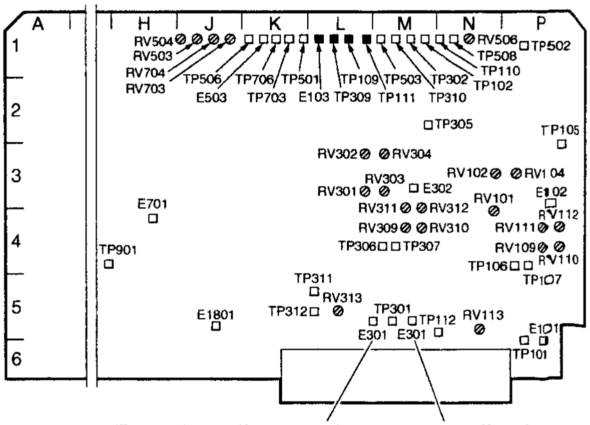
NTSC model (METAL C)



PAL model (METAL C)



3. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)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RV504
RV503
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RV703
TP506
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E701
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RV313
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TP301
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RV113
E1801
E301
E301
E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

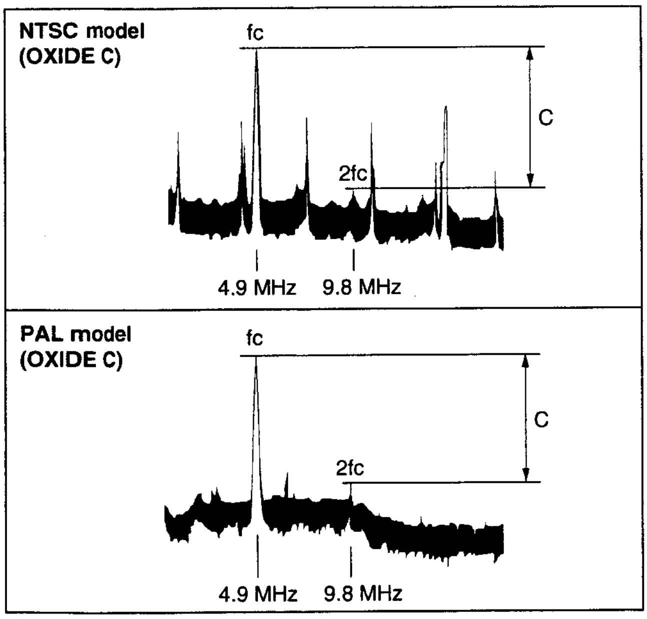
DM-123 Board (Side A)

4. OXIDE C Adjustment

Note

Connection of the oscilloscope remains unchanged.

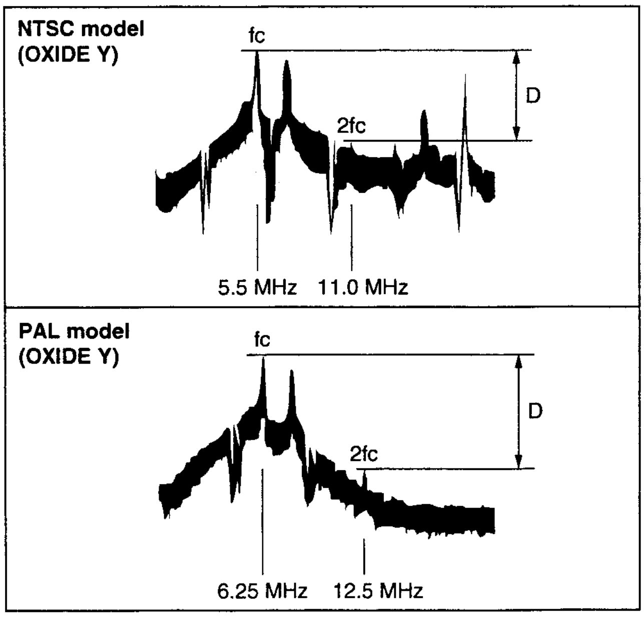
1. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-C-A and OMC LIM OXIDE-C-B
   Specification: C ≧ 35 dB

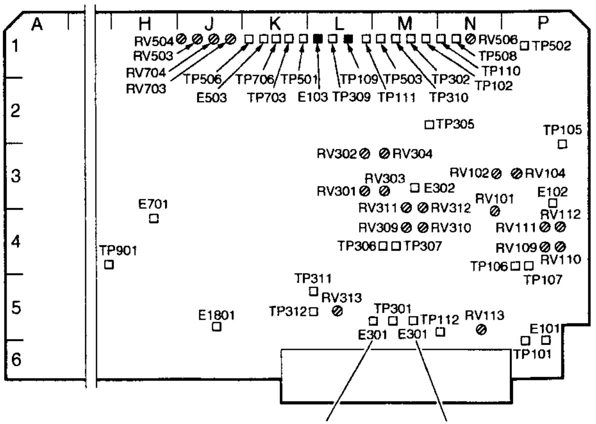


2. Stop the playback of the alignment tape.

5. OXIDE Y Adjustment

1. Change the connection of the oscilloscope's CH-2 as follows:
   (Keep the setting of the oscilloscope and connection of the oscilloscope's CH-1.)
   CH-2: TP109/DM-123(L-1),
   GND: E103/DM-123(L-1)
2. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS
   Adj. points: A37 : OMC LIM BALANCE VR : OMC LIM OXIDE-Y-A and OMC LIM OXIDE-Y-B
   Specification: D ≧ 35 dB

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TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

3. Stop the playback of the alignment tape.
4. To exit A37 : OMC LIM BALANCE VR, press the F6 (EXIT) button once.

---

6. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

8-7-10. OMC Carrier Balance Provisional Adjustment

Notes

- This provisional adjustment explains how to adjust without using the spectrum analyzer.
  If "8-7-9. OMC Carrier Balance Adjustment" is performed using the spectrum analyzer, this provisional adjustment is not required.
- Perform this provisional adjustment only when the spectrum analyzer is not available for an urgent maintenance. At a later date, be sure to perform "8-7-9. OMC Carrier Balance Adjustment" using the spectrum analyzer.

Tool

- Analog composite video monitor

Preparation

1. Enter the maintenance mode.
2. Enter A37 : OMC LIM BALANCE VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A37 : OMC LIM BALANCE VR
3. Change the each data value to the following initial data value.

(A37 : OMC LIM BALANCE VR) Item	Setting data NTSC model in 59.94/525	PAL model in 50/625
OMC LIM METAL-Y-A	77	78
OMC LIM METAL-Y-B	77	78
OMC LIM METAL-C-A	54	51
OMC LIM METAL-C-B	54	51
OMC LIM OXIDE-Y-A	78	78
OMC LIM OXIDE-Y-B	78	78
OMC LIM OXIDE-C-A	55	55
OMC LIM OXIDE-C-B	55	55

4. To exit A37 : OMC LIM BALANCE VR, press the F6 (EXIT) button once.

Saving the Data

5. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

6. Exit the maintenance mode.

8-7-11. Demodulator Limiter Balance Adjustment

Note

In the Y adjustment when the spectrum analyzer is not available for an urgent maintenance, omit steps 4 through 8. However, if steps 1 through 3 only had been done, be sure to perform the Y adjustment by spectrum analyzer (steps 4 through 8) later.

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Spectrum analyzer:
  Advantest R3261A or equivalent
- Analog composite video monitor
- Alignment tapes
  For NTSC model: CR5-1 and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS

Preparation

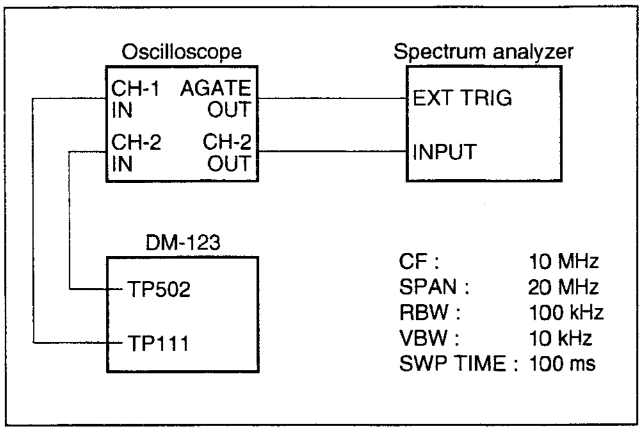
1. Stop extending the DM-123 board.

Note

Before removing the board, turn off the power.

2. Connect the equipment.

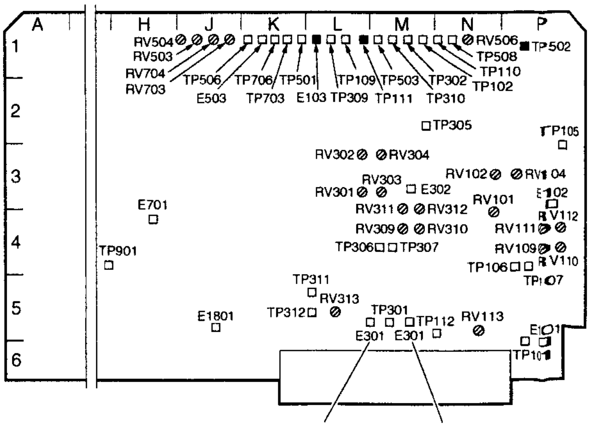
Connect the oscilloscope and spectrum analyzer.


Oscilloscope
CH-1 IN
AGATE OUT
CH-2 IN
CH-2 OUT
Spectrum analyzer
EXT TRIG
INPUT
DM-123
TP502
TP111
CF : 10 MHz
SPAN : 20 MHz
RBW : 100 kHz
VBW : 10 kHz
SWP TIME : 100 ms

Connection and Setting of the Spectrum Analyzer

3. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).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TP102
TP110
TP508
RV506
TP502
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E302
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E102
RV112
RV311
RV312
RV309
RV310
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E1801
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E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

1. Y Adjustment

Note

When the spectrum analyzer is not available for an urgent maintenance, omit steps 4 through 8 in the Y adjustment. If steps 1 through 3 only had been done, be sure to perform the whole "1. Y adjustment" at a later date.

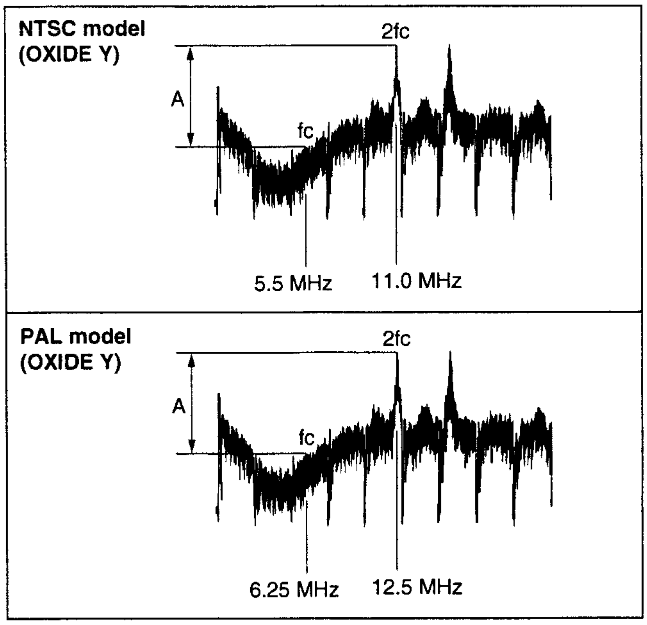
1. Enter the maintenance mode.
2. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A38 : DEMO BAL/ETC. VR
3. Change the each data value to the following initial data value.

(A38 : DEMO BAL/ETC. VR) Item	Setting data NTSC model in 59.94/525	PAL model in 50/625
DEMO BAL METAL-Y	83	80
DEMO BAL METAL-C	83	80
DEMO BAL OXIDE-Y	83	83
DEMO BAL OXIDE-C	83	83

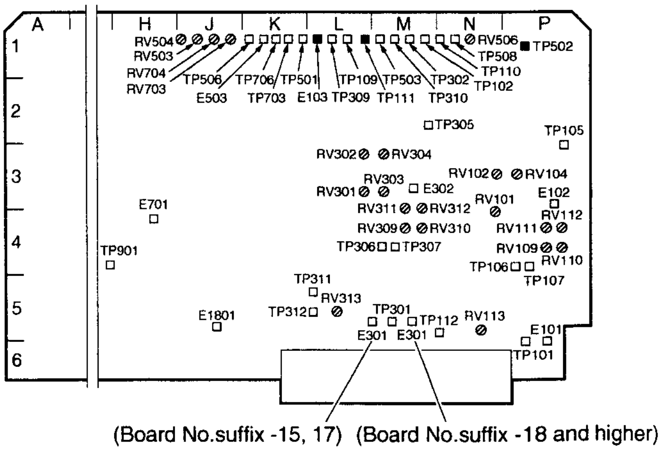
4. Connect and set the oscilloscope as follows:
   CH-1: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   CH-2: TP502/DM-123(P-1), AC 1 V/DIV
   GND: E103/DM-123(P-1)
   TIME: 5 ms/DIV
   TRIG: CH-1, – slope

(OXIDE Y)

5. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Pulse & bar signal (9:00 to 11:00) of CR5-2A / CR5-2A PS
   Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-Y
   Specification: Maximize the level difference A. (Minimize the fc.)



6. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)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E103
TP309
TP109
TP111
TP503
TP310
TP302
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV112
RV311
RV312
RV309
RV310
RV111
E701
TP306
TP307
RV109
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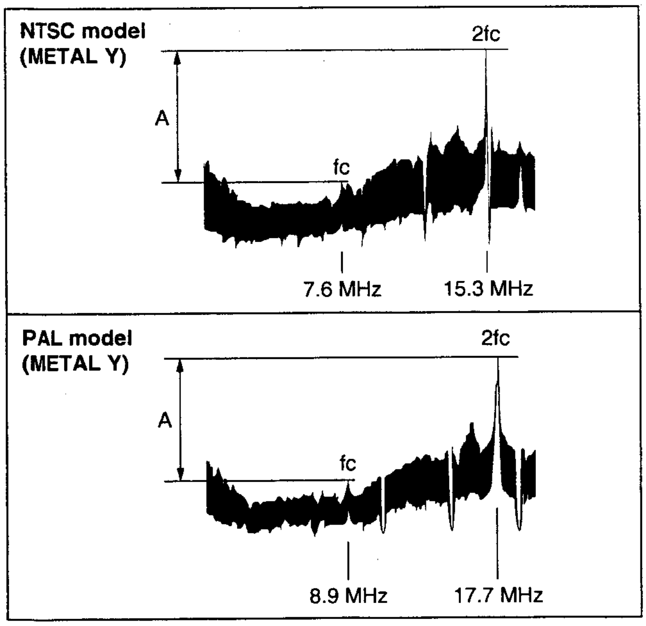
TP901
TP106
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

(METAL Y)

7. Play back the alignment tape in PLAY mode, then adjust the level difference between the fc and 2fc on the spectrum analyzer.
   PB portion: Flat field signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-Y
   Specification: Maximize the level difference A. (Minimize the fc.)



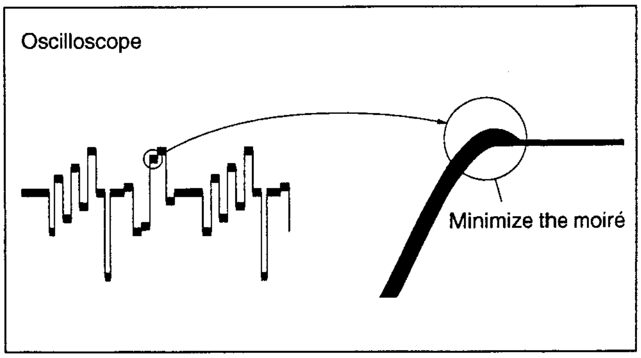
8. Stop the playback of the alignment tape.

2. C Adjustment

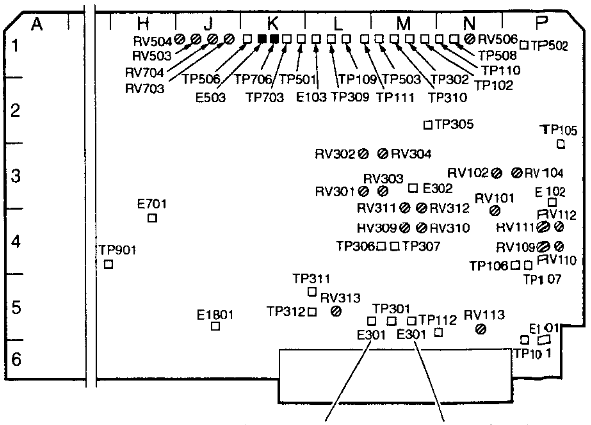
1. Connect and set the oscilloscope as follows:
   CH-1: TP706/DM-123(K-1), AC 200 mV/DIV
   GND: E503/DM-123(K-1)
   TIME: 10 μs/DIV

(METAL C)

2. Play back the alignment tape in PLAY mode, then adjust the moiré of specified part on the oscilloscope.
   PB portion: Color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL METAL-C
   Specification: Minimize the moiré of specified part.


Oscilloscope
Minimize the moiré

3. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)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RV504
RV503
RV704
RV703
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TP503
TP111
TP302
TP310
RV506
TP508
TP110
TP102
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TP105
RV302
RV304
RV303
RV301
E302
RV102
RV104
RV101
E102
RV112
RV311
RV312
HV309
RV310
HV111
TP306
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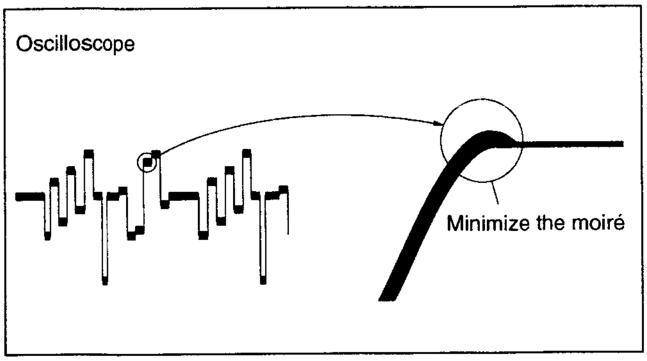
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

(OXIDE C)

4. Play back the alignment tape in PLAY mode, then adjust the moiré of specified part on the oscilloscope.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: A38 : DEMO BAL/ETC. VR : DEMO BAL OXIDE-C
   Specification: Minimize the moiré of specified part.



5. Stop the playback of the alignment tape.
6. To exit A38 : DEMO BAL/ETC. VR, press the F6 (EXIT) button once.

3. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

8-7-12. Non-Linear Output Level Adjustment

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS

Preparation

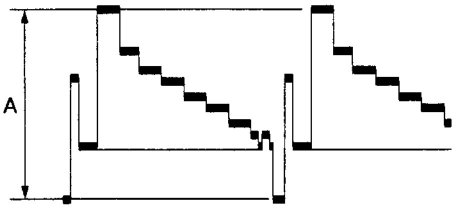
1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

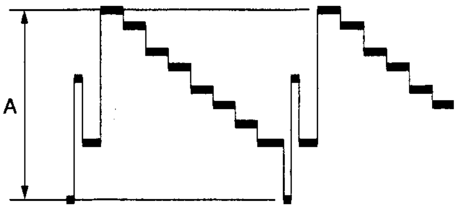
1. METAL Y Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP506/DM-123(K-1), AC 200 mV/DIV
   GND: E503/DM-123(K-1)
   TIME: 10 µs/DIV
2. Play back the alignment tape in PLAY mode, then adjust the level of specified part on the oscilloscope.
   PB portion: Color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV503/DM-123(J-1)
   Specification: A = 1.00 ±0.01 V

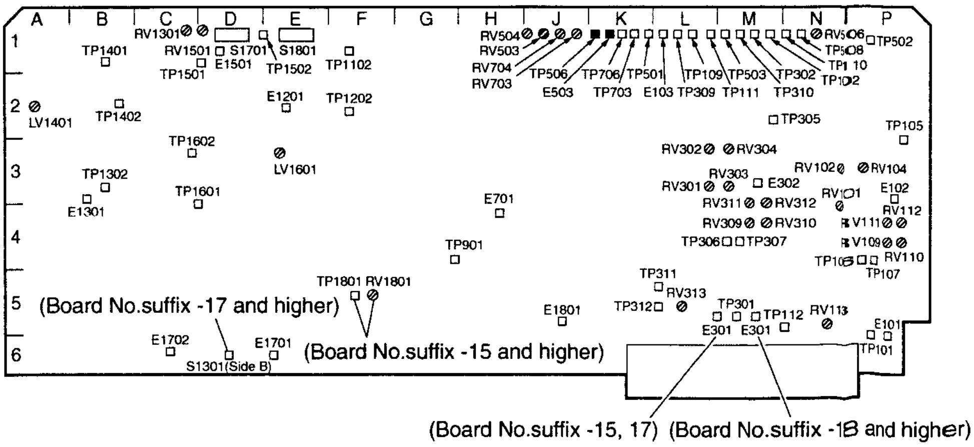
NTSC model



PAL model



3. Stop the playback of the alignment tape.


A
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RV1301
RV1501
S1701
S1801
TP1401
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
E701
TP901
TP1801 RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
(Board No.suffix -15 and higher)
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
E503
TP703
E103
TP309
TP111
TP310
RV506
TP508
TP110
TP102
TP502
TP305
TP105
RV302
RV304
RV303
RV102
RV104
RV301
E302
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
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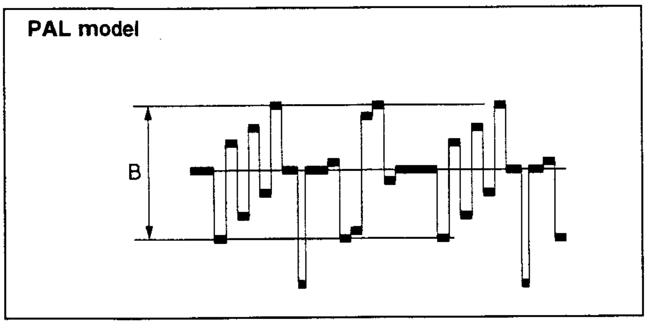
TP108
RV110
TP107
TP311
RV313
E1801
TP312
TP301
TP112
RV113
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

2. METAL C Adjustment for PAL Model Only

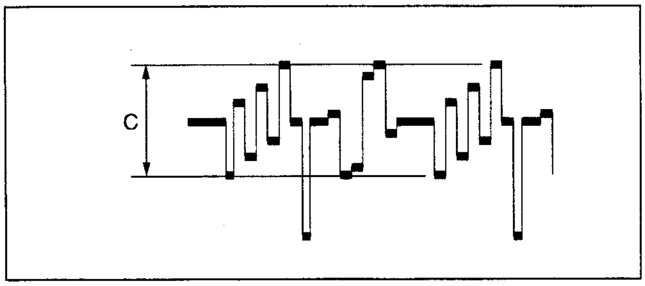
1. Change the connection of the oscilloscope as follows:
   CH-1: TP706/DM-123(K-1)
   GND: E503/DM-123(K-1)
2. Play back the alignment tape in PLAY mode, then adjust the level of specified part on the oscilloscope.
   PB portion: 100% color-bar signal (14:00 to 17:00) of CR5-1B PS
   Adj. point: ⊘RV703/DM-123(J-1)
   Specification: B = 933 ± 10 mV



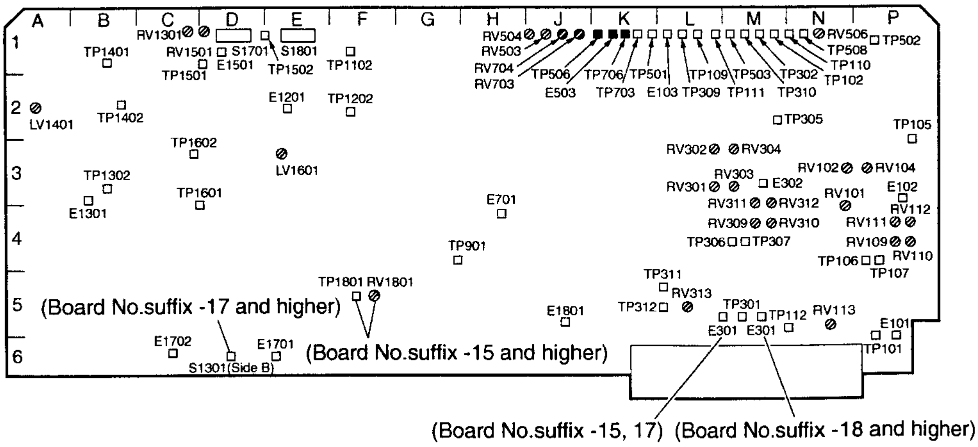
3. Eject the alignment tape.

3. C (NTSC Model) / OXIDE C (PAL Model) Adjustment

1. Change the connection of the oscilloscope as follows:
   CH-1: TP706/DM-123(K-1)
   GND: E503/DM-123(K-1)
2. Play back the alignment tape in PLAY mode, then adjust the level of specified part on the oscilloscope.
   PB portion: 75% color-bar signal
   NTSC model: 14:00 to 17:00 in CR5-1B
   PAL model: 0:00 to 3:00 in CR5-2A PS
   Adj. point: ⊘RV704/DM-123(J-1)
   Specification: C = 700 ± 10 mV



3. Stop the playback of the alignment tape.
4. **For NTSC model only:**
   Eject the alignment tape.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RV1301
RV1501
S1701
S1801
TP1401
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
TP901
E701
TP1801 RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
(Board No.suffix -15 and higher)
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
TP102
E503
TP703
E103
TP309
TP111
TP310
RV506
TP502
TP508
TP110
TP305
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RV311
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RV110
TP107
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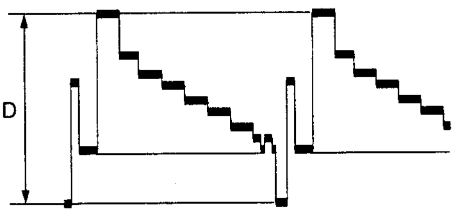
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

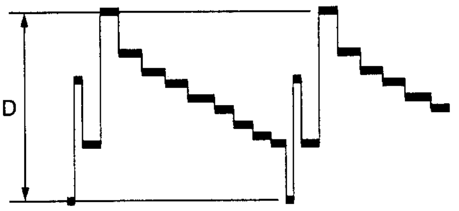
4. OXIDE Y Adjustment

1. Change the connection of the oscilloscope as follows:
   CH-1: TP506/DM-123(K-1)
   GND: E503/DM-123(K-1)
2. Play back the alignment tape in PLAY mode, then adjust the level of specified part on the oscilloscope.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: ⊘RV504/DM-123(J-1)
   Specification: D = 1.00 ±0.01 V

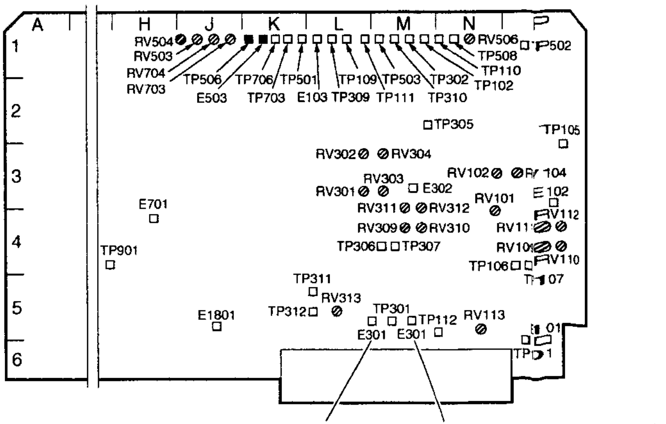
NTSC model



PAL model



3. Eject the alignment tape.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TP101
E1801
E301
E301
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

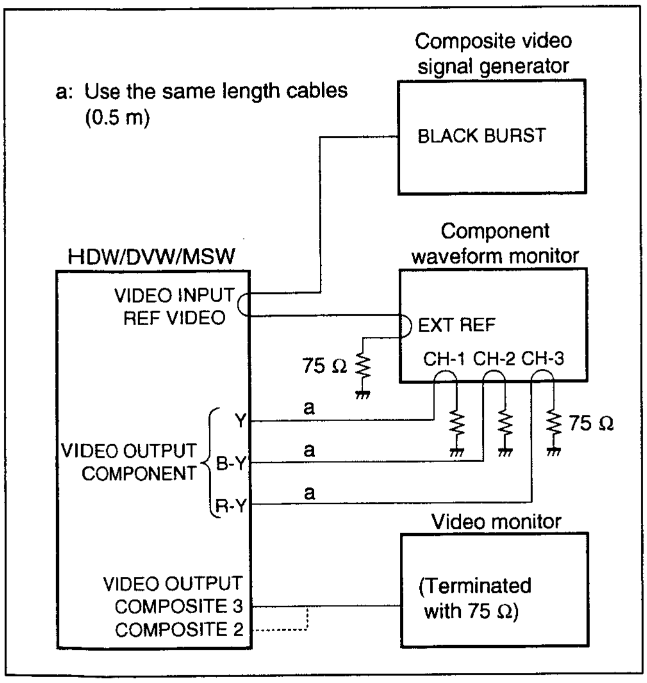
8-7-13. PB Frequency Response Adjustment

Tools

- Analog composite video signal generator
  For NTSC Model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS
- 75 Ω terminators (4 pieces)

Preparation

1. Connect the equipment.


a: Use the same length cables (0.5 m)
Composite video signal generator
BLACK BURST
HDW/DVW/MSW
Component waveform monitor
VIDEO INPUT
REF VIDEO
EXT REF
75 Ω
CH-1 CH-2 CH-3
Y
a
75 Ω
VIDEO OUTPUT COMPONENT
B-Y
a
R-Y
a
Video monitor
VIDEO OUTPUT
COMPOSITE 3
COMPOSITE 2
(Terminated with 75 Ω)

Connection

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

1. Enter the Maintenance Mode and Check the Initial Data.

1. Enter the maintenance mode.
2. Enter A3 : BETACAM PB (DM) .
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM)

The following step 3 is required only when the DM-123 board or NV-RAM (IC1805/DM-123) was replaced.

3. Check that the specified initial data are set for the following items.

(A3 : BETACAM PB (DM)) Sub-menu	Item	Setting data NTSC model in 59.94/525	PAL model in 50/625
A31 : COS EQ VR (METAL-Y)	EQ1 METAL-Y-A	88	90
	EQ1 METAL-Y-B	88	90
A32 : COS EQ VR (METAL-C)	EQ1 METAL-C-A	85	8A
	EQ1 METAL-C-B	85	8A
A33 : COS EQ VR (OXIDE-Y)	EQ1 OXIDE-Y-A	C8	A5
	EQ1 OXIDE-Y-B	C8	A5
A34 : COS EQ VR (OXIDE-C)	EQ1 OXIDE-C-A	96	95
	EQ1 OXIDE-C-B	96	95

2. METAL Y Adjustment

1. Enter A31 : COS EQ VR (METAL-Y).
2. Watch the Y output signal on the analog component waveform monitor.

   Note

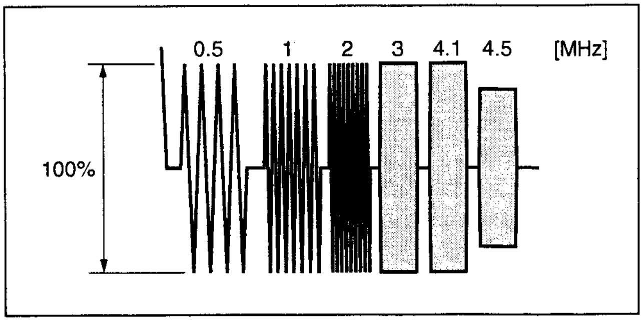
   As the Y output is overlapped the outputs of A channel and B channel on the component waveform monitor, adjust/check the level at each channel.

3. Play back the alignment tape in PLAY mode, then measure level at 0.5 MHz (NTSC model) / 2T BAR (PAL model).
   PB portion: Multi-burst signal (8:00 to 11:00) of CR5-1B / CR5-1B PS
   Use this measured level as a reference level 100% (0 dB).
4. Adjust the level at 4.1 MHz (NTSC model) / 5 MHz (PAL model).
   PB portion: The same as step 3
   Adj. points:
   A channel: A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-A
   B channel: A31 : COS EQ VR (METAL-Y) : EQ1 METAL-Y-B
   Specification (A and B channels): See the following table.
5. Play back the alignment tape in PLAY mode, then check each level at the other frequency parts.
   PB portion: The same as step 3
   Specification (A and B channels): See the following table.

6. Connect the video monitor to VIDEO OUTPUT COMPOSITE 2 connector.
7. Play back the alignment tape in PLAY mode, then check the playback picture on the video monitor.
   PB portion: The same as step 2
   Specification: It has not flicker.
8. Reconnect the video monitor to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
9. To exit A31 : COS EQ VR (METAL-Y), press the F6 (EXIT) button once.

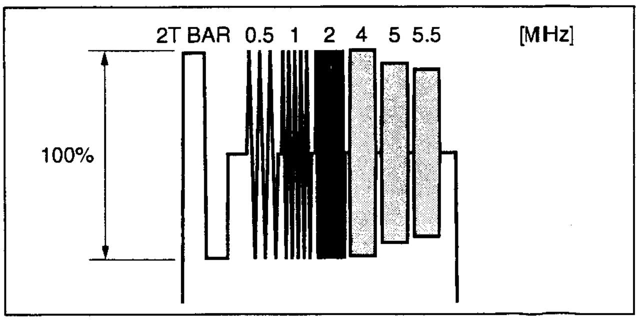
NTSC model Specifications

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
4.1 MHz	Adjust: 94% (100 to 90%) {$-0.5\ ^{+0.5}_{-0.4}$ dB}
1 MHz 2 MHz 3 MHz	Check: 100% (106 to 63%) {$0\ ^{+0.5}_{-4.0}$ dB}
4.5 MHz	Check: 80% (106 to 63%) {$-2.0\ ^{+2.5}_{-2.0}$ dB}



PAL model Specifications

Frequency	Specification for PAL model (Level at 2T BAR is 100% {0 dB}.)
5 MHz	Adjust: 91% (96 to 87%) {−0.8 ±0.4 dB}
0.5 MHz 1 MHz 2 MHz 4 MHz	Check: 100% (106 to 63%) {$0\ ^{+0.5}_{-4.0}$ dB}
5.5 MHz	Check: 84% (106 to 63%) {$-1.5\ ^{+2.0}_{-2.5}$ dB}



3. METAL C Adjustment

1. Enter A32 : COS EQ VR (METAL-C).
2. Watch the R-Y output signal on the analog component waveform monitor.

   Note

   As the R-Y(B-Y) output is overlapped the outputs of A channel and B channel on the component waveform monitor, adjust/check the level at each channel.

3. Play back the alignment tape in PLAY mode, then measure level at 7T BAR (NTSC model) / 8T BAR (PAL model).

   PB portion: Multi-burst signal (8:00 to 11:00) of CR5-1B / CR5-1B PS

   Use this measured level as a reference level 100% (0 dB).
4. Adjust the level at 1 MHz (NTSC model) / 1.5 MHz (PAL model).

   PB portion: The same as step 3

   Adj. points:

   A channel: A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-A

   B channel: A32 : COS EQ VR (METAL-C) : EQ1 METAL-C-B

   Specifications (A and B channels): See the following table.
5. Play back the alignment tape in PLAY mode, then check each level at the other frequency parts.

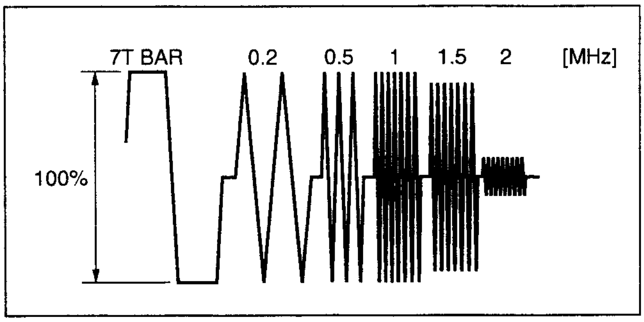
   PB portion: The same as step 3

   Specifications (A and B channels): See the following table.

6. Watch the B-Y output signal on the component waveform monitor.
7. Check that the B-Y output signal levels at every frequencies are within the following specifications. If the B-Y output signal is out of specifications, perform fine adjustment for R-Y until the specifications for R-Y and B-Y output signals.
8. To exit A32 : COS EQ VR (METAL-C) , press the F6 (EXIT) button once.
9. Eject the alignment tape.

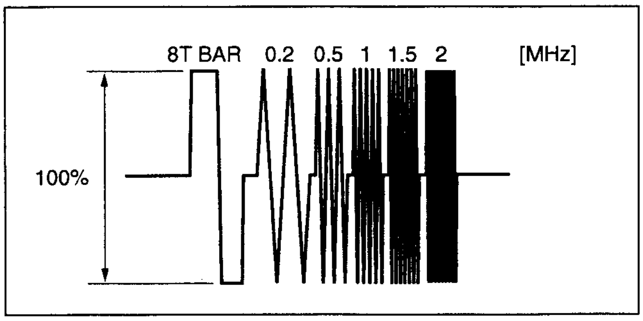
NTSC model Specifications

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
1 MHz	Adjust: 94% (100 to 89%) {−0.5 ±0.5 dB}
0.2 MHz 0.5 MHz	Check: 100% (106 to 63%) {0 $^{+0.5}_{-3.0}$ dB}
1.5 MHz	Check: 80% (106 to 71%) {−2.0 $^{+2.5}_{-1.0}$ dB}



PAL model Specifications

Frequency	Specification for PAL model (Level at 8T BAR is 100% {0 dB}.)
1.5 MHz	Adjust: 93% (102 to 85%) {−0.6 ±0.8 dB}
0.2 MHz 0.5 MHz 1 MHz	Check: 100% (106 to 71%) {0 $^{+0.5}_{-3.0}$ dB}
2 MHz	Check: 80% (106 to 71%) {−2.0 $^{+2.5}_{-1.0}$ dB}



4. OXIDE Y Adjustment

1. Enter A33 : COS EQ VR (OXIDE-Y).
2. Watch the Y output signal on the analog component waveform monitor.

   Note

   As the Y output is overlapped the outputs of A channel and B channel on the component waveform monitor, adjust/check the level at each channel.

3. Play back the alignment tape in PLAY mode, then measure level at 0.5 MHz (NTSC model) / 2T BAR (PAL model).

   PB portion: Multi-burst signal (3:00 to 6:00) of CR5-2A / CR5-2A PS

   Use this measured level as a reference level 100% (0 dB).
4. Adjust the level at 2 MHz (NTSC model) / 3 MHz (PAL model).

   PB portion: The same as step 3

   Adj. points:

   A channel: A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-A

   B channel: A33 : COS EQ VR (OXIDE-Y) : EQ1 OXIDE-Y-B

   Specifications (A and B channels): See the following table.
5. Play back the alignment tape in PLAY mode, then check each level at the other frequency parts.

   PB portion: The same as step 3

   Specifications (A and B channels): See the following table.
6. Play back the alignment tape in PLAY mode, then check the output level difference between A and B channels at high frequency (4.5 MHz) part.

   PB portion: The same as step 3

   Specification: They should be nearly identical.

   Note

   If the difference is pronounced, adjust the data of "SUB OXIDE-Y-A" or "SUB OXIDE-Y-B" in A33 : COS EQ VR (OXIDE-Y) as following steps (1) and (2) below.

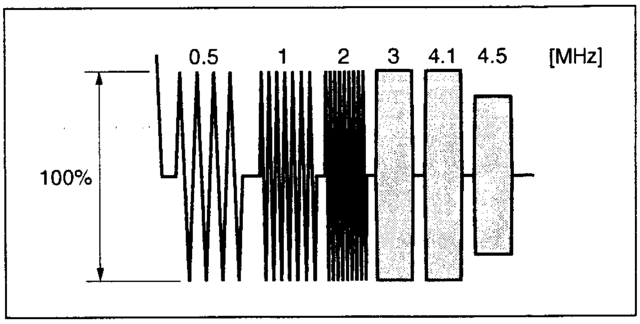
   (1) Change the data of "SUB OXIDE-Y-A" (A channel side) to find which channel level is lower.

   (2) If the B channel side is lower, reset the data of "SUB OXIDE-Y-A" to the former data, then adjust the data of "SUB OXIDE-Y-B" until both levels at 4.5 MHz become nearly identical.

   If the A channel side is lower, adjust the data of "SUB OXIDE-Y-A" until both levels at 4.5 MHz become nearly identical.

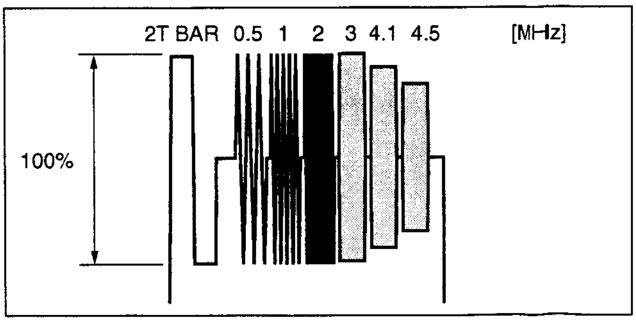
NTSC model Specifications

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
2 MHz	Adjust: 100% (104 to 95%) {0 $^{+0.3}_{-0.4}$ dB}
1 MHz	Check: 100% (106 to 50%) {0 $^{+0.5}_{-6.0}$ dB}
3 MHz	Check: 89% (106 to 50%) {−1.0 $^{+1.5}_{-5.0}$ dB}
4.1 MHz	Check: 71% (106 to 50%) {−3.0 $^{+3.5}_{-3.0}$ dB}



PAL model Specifications

Frequency	Specification for PAL model (Level at 2T BAR is 100% {0 dB}.)
3 MHz	Adjust: 89% (100 to 79%) {−1.0 ±1.0 dB}
0.5 MHz 1 MHz, 2 MHz	Check: 100% (106 to 50%) {0 $^{+0.5}_{-6.0}$ dB}
4.1 MHz	Check: 71% (106 to 50%) {−3.0 $^{+3.5}_{-3.0}$ dB}



7. To exit A33 : COS EQ VR (OXIDE-Y) , press the F6 (EXIT) button once.

5. OXIDE C Adjustment

1. Enter A34 : COS EQ VR (OXIDE-C).
2. Watch the R-Y output signal at the analog component waveform monitor.

   Note

   As the R-Y (B-Y) output is overlapped the outputs of A channel and B channel on the component waveform monitor, adjust/check the level at each channel.

3. Play back the alignment tape in PLAY mode, then measure level at 7T BAR (NTSC model) / 8T BAR (PAL model).

   PB portion: Multi-burst signal (3:00 to 6:00) of CR5-2A / CR5-2A PS

   Use this measured level as a reference level 100% (0 dB).
4. Adjust the level at 1 MHz.

   PB portion: The same as step 3

   Adj. points:

   A channel: A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-A

   B channel: A34 : COS EQ VR (OXIDE-C) : EQ1 OXIDE-C-B

   Specifications (A and B channels):
   See the following table.
5. Play back the alignment tape in PLAY mode, then check each level at the other frequency parts.

   PB portion: The same as step 3

   Specifications (A and B channels):
   See the following table.
6. Watch the B-Y output signal on the component waveform monitor.
7. Also check the B-Y output signal levels as specified in steps 4 and 5.

   If it is out of the specifications, fine-adjust both R-Y and B-Y output signals until they are within the following specifications.
8. To exit A34 : COS EQ VR (OXIDE-C), press the F6 (EXIT) button once.
9. Eject the alignment tape.

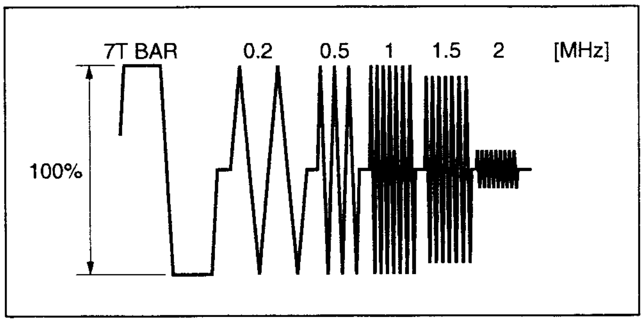
6. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

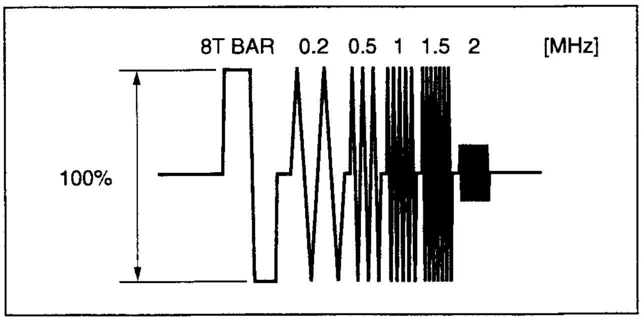
NTSC model Specifications

Frequency	Specification for NTSC model (Level at 0.5 MHz is 100% {0 dB}.)
1 MHz	Adjust: 94% (100 to 89%) {−0.5 ±0.5 dB}
0.2 MHz	Check: 100% (106 to 71%) $\{0\ ^{+0.5}_{-3.0}\ \text{dB}\}$
0.5 MHz	Check: 95% (106 to 71%) $\{-0.4\ ^{+0.9}_{-2.6}\ \text{dB}\}$
1.5 MHz	Check: 80% (106 to 71%) $\{-2.0\ ^{+2.5}_{-1.0}\ \text{dB}\}$



PAL model Specifications

Frequency	Specification for PAL model (level at 8T BAR is 100% {0 dB}.)
1 MHz	Adjust: 94% (102 to 86%) {−0.5 ±0.8 dB}
0.2 MHz 0.5 MHz	Check: 100% (106 to 71%) $\{0\ ^{+0.5}_{-3.0}\ \text{dB}\}$
1.5 MHz	Check: 84% (106 to 71%) $\{-1.5\ ^{+2.0}_{-1.5}\ \text{dB}\}$



8-7-14. Drop-out Compensation Equalizer Adjustment

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Extension board: EX-739
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS

Preparation

1. Turn the power off, then extend the DM-123 board with an extension board EX-739.

2. Set the switch on the DM-123 board.

S1801 (E-1): Bit-5 (AGC OFF) → ON

3. Set the switch on the SS-89 board.

S101 (P-1): Bit-2 (Y/C DLY FB OFF) → ON

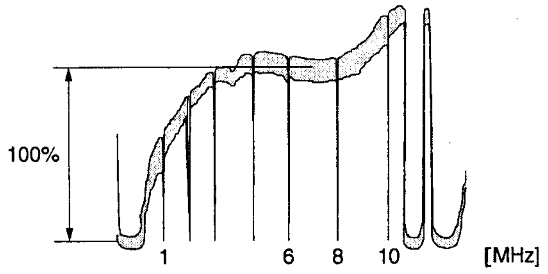
4. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

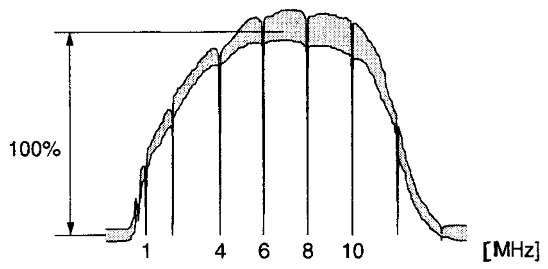
1. METAL Y Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP112/DM-123(N-5), DC >200 mV/DIV
   GND: E101/DM-123(P-6)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 2 ms/DIV
   TRIG: CH-2, – slope
2. Play back the alignment tape in PLAY mode, then measure the level at 6 MHz part.
   PB portion: RF sweep signal (0:00 to 2:00) of CR5-1B / CR5-1B PS
3. Play back the alignment tape in PLAY mode, then adjust the levels at 8 MHz and 10 MHz parts.
   PB portion: The same as step 2
   Adj. point: ⊘RV109/DM-123(P-4)
   Specifications (Level at 6 MHz is 100% {0 dB}.):
   8 MHz: 100 ±20 % {0 ±2.0 dB}
   10 MHz: NTSC model: 120 $^{+50}_{-20}$ % {2.0 $^{+5.0}_{-2.0}$ dB}
   PAL model: 110 $^{+40}_{-20}$ % {1.0 $^{+4.0}_{-2.0}$ dB}

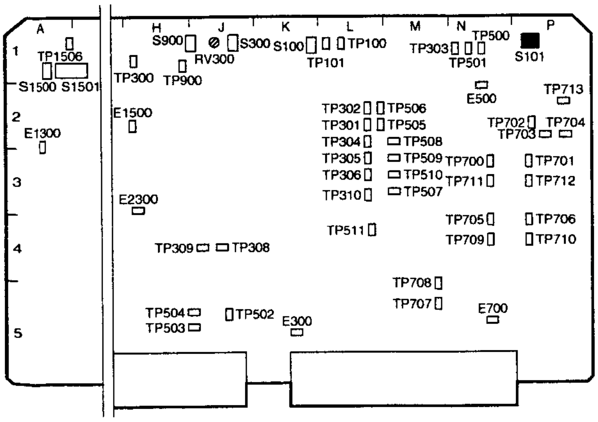
NTSC model (METAL Y)



PAL model (METAL Y)



4. Stop the playback of the alignment tape.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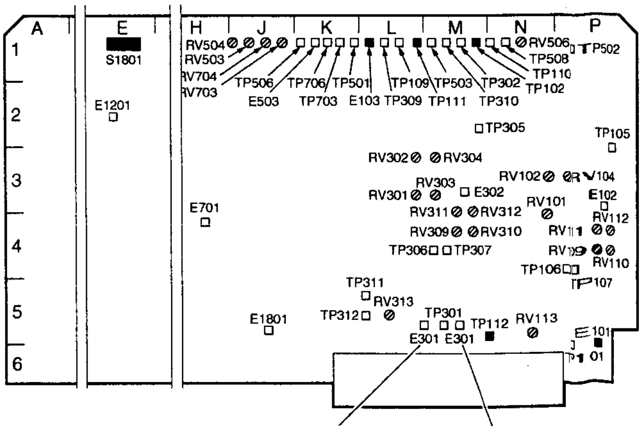
E700
TP503

SS-89 Board (Side A)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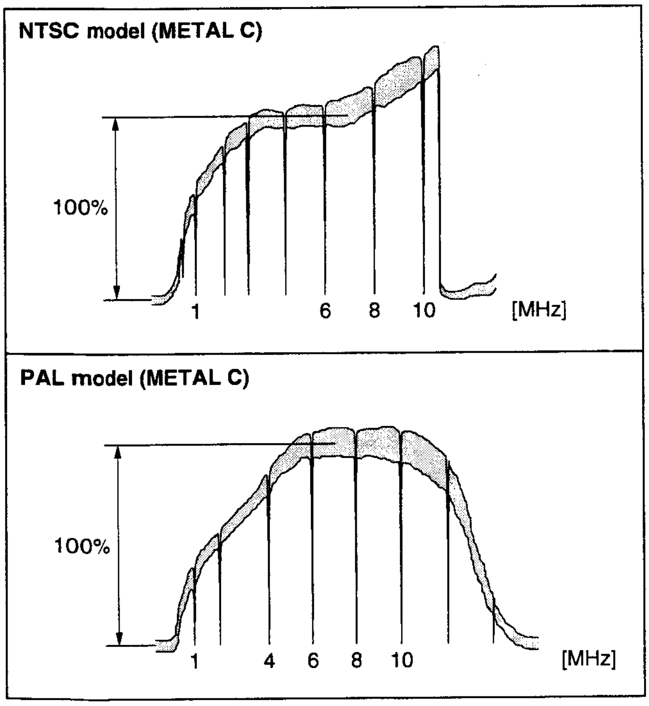
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

2. METAL C Adjustment

1. Change the connection of the oscilloscope as follows:
   CH-1: TP312/DM-123(L-5),
   GND: E301/DM-123(L-5)
   CH-2: TP111/DM-123(L-1),
   GND: E103/DM-123(L-1)
2. Play back the alignment tape in PLAY mode, then measure the level at 6 MHz part.
   PB portion: RF sweep signal (0:00 to 2:00) of
   CR5-1B / CR5-1B PS
   Use this measured level as a reference level 100% (0 dB).
3. Play back the alignment tape in PLAY mode, then adjust the levels at 8 MHz and 10 MHz parts.
   PB portion: The same as step 2
   Adj. point: ⊘RV309/DM-123(M-4)
   Specifications (Level at 6 MHz is 100% {0 dB}.):
   8 MHz: 100 ± 20 % {0 ± 2.0 dB}
   10 MHz: $110 ^{+40}_{-20}$ % {$1.0 ^{+4.0}_{-2.0}$ dB}



4. Stop the playback of the alignment tape.

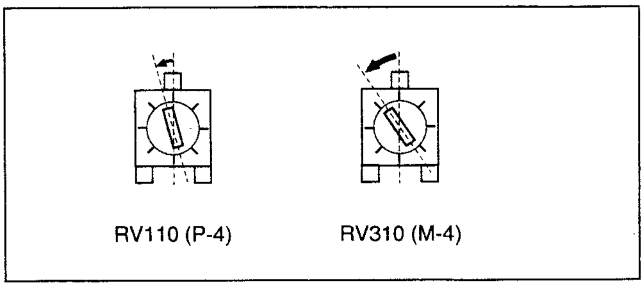
Note

When you are going to perform the following "8-7-15. DM RF Output Level Readjustment", it is not necessary to eject the alignment tape.

5. Reset the switches Bit-5 of S1801/DM-123 (E-1) and Bit-2 of S101/SS-89 (P-1) to OFF (down side).

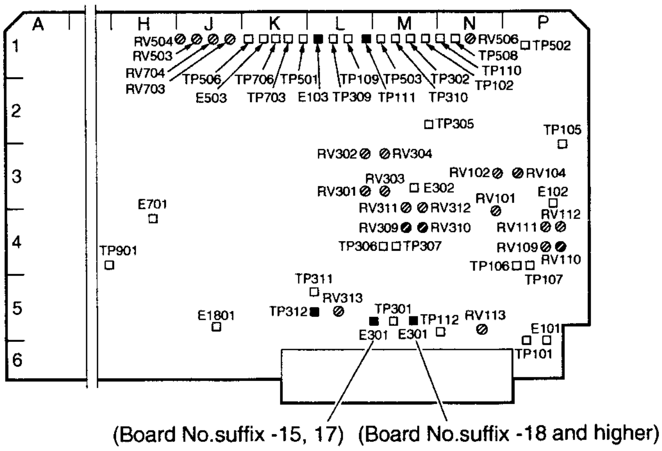
3. OXIDE Y/C Adjustment

Set the following RVs on the DM-123 board to each specified position as shown figure below.


RV110 (P-4)
RV310 (M-4)

8-7-15. DM RF Output Level Readjustment

Readjust the DM RF output level referring to Section 8-7-7.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TP901
TP311
RV313
TP312
TP301
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RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-16. RF Envelope Adjustment

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Analog composite video monitor
- Extension board: EX-739
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS

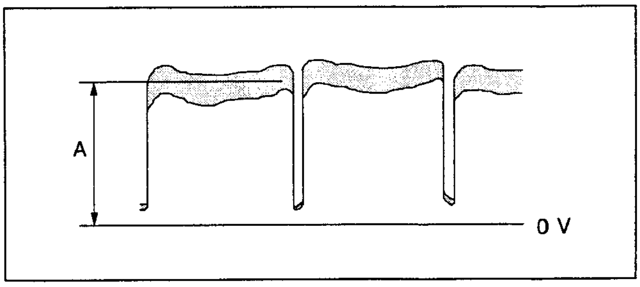
Preparation

1. Conditions to be kept are:

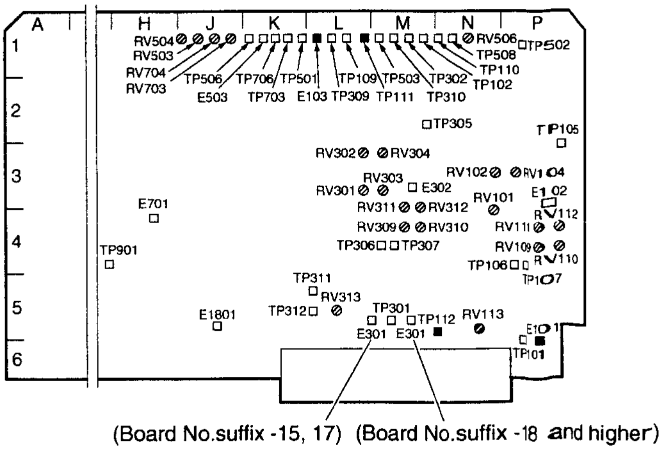
- Extension of DM-123 board.
- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

1. Y Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP112/DM-123(N-5), DC 500 mV/DIV
   GND: E101/DM-123(P-6)
   CH-2: TP111/DM-123(L-1), DC 1 V/DIV
   GND: E103/DM-123(L-1)
   TIME: 5 ms/DIV
   TRIG: CH-2, – slope
2. Play back the alignment tape in PLAY mode, then adjust the DC level at CH-1 on the oscilloscope.
   PB portion: Flat filed signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV113/DM-123(N-5)
   Specification: A = 2.0 ±0.2 V dc



3. Stop the playback of the alignment tape.


A
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RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP310
TP302
TP102
TP110
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV303
RV301
E302
RV102
RV104
RV101
E102
RV112
RV311
RV312
RV309
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TP306
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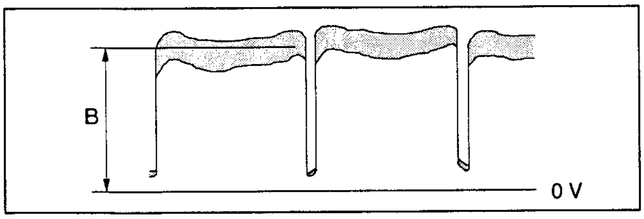
RV109
RV110
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

2. C Adjustment

1. Change the connection of the oscilloscope as follows:
   CH-1: TP312/DM-123(L-5)
   GND: E301/DM-123(M-5)
   CH-2: TP111/DM-123(L-1)
   GND: E103/DM-123(L-1)
2. Play back the alignment tape in PLAY mode, then adjust the DC level at CH-1 on the oscilloscope.
   PB portion: Flat filed signal (24:00 to 26:00) of CR5-1B / CR5-1B PS
   Adj. point: ⊘RV313/DM-123(L-5)
   Specification: B = 2.0 ±0.2 V dc



3. Stop the playback of the alignment tape.

3. Threshold Level Setting (Check)

1. Enter the maintenance mode.
2. Enter A36 : DO TH/ENV TH VR.
   Maintenance mode → M1 : ADJUST → A3 : BETA-CAM PB (DM) → A36 : DO TH/ENV TH VR
3. Ensure that the data of the following items in A36 : DO TH/ENV TH VR are the specified data value.

Item (A36 : DO TH/ENV TH VR)	Setting data
ENV-TH-A	20
ENV-TH-B	20

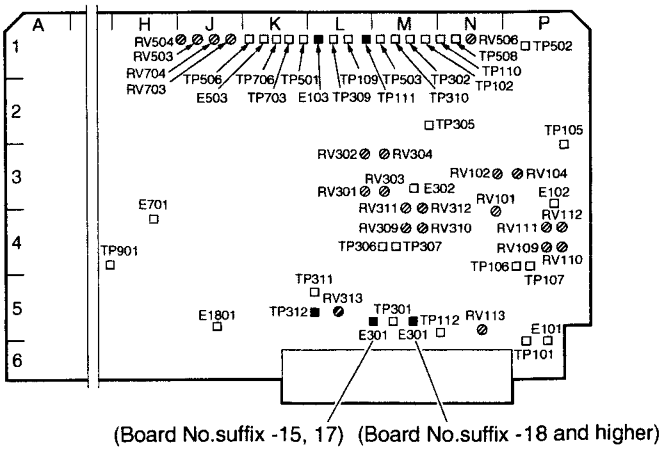
4. To exit A36 : DO TH/ENV TH VR, press the F6 (EXIT) button once.

Saving the Data

When the data was not changed in step 3, skip over to step 6.

5. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

6. Exit the maintenance mode.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RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP309
TP109
TP111
TP503
TP302
TP310
TP110
TP102
TP508
RV506
TP502
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV112
E701
RV311
RV312
RV309
RV310
RV111
TP306
TP307
RV109
RV110
TP106
TP107
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-17. Search Picture Adjustment

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Digital voltmeter: Advantest TR6845 or equivalent
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS
- Shorting clips (2 pieces)

Preparation

1. Reattach the DM-123 board without using the extension board.

Note

Before removing the boards, turn off the power.

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

1. Voltage Adjustment

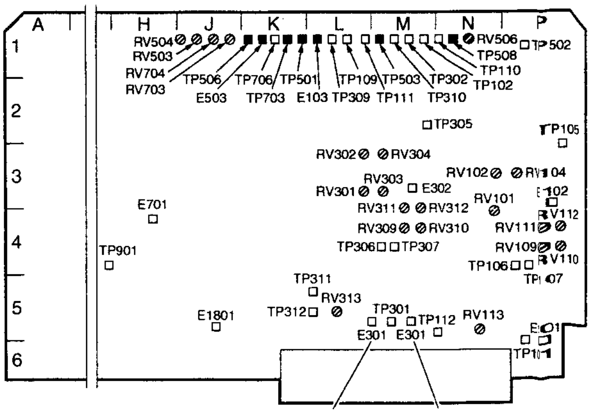
1. Enter the maintenance mode.
2. Enter A38 : DEMO BAL/ETC. VR.
   Maintenance mode → M1 : ADJUST → A3 : BETACAM PB (DM) → A38 : DEMO BAL/ETC. VR
3. Play back the alignment tape in PLAY mode, then measure each DC level at the following measurement points using the digital voltage meter. (Write down measured levels on the following table.)
   PB portion: Color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS

Measurement point	Measured DC level
TP508/DM-123 (N-1)	
TP503/DM-123 (M-1)	
TP703/DM-123 (K-1)	

4. Stop the playback of the alignment tape.
5. Turn RV506/DM-123(N-1) fully clockwise (↻).
6. Short-circuit TP501/DM-123(L-1) and E103/DM-123 (L-1) with a shorting clip.
7. Play back the alignment tape in PLAY mode, then adjust each DC level at the following measurement points.
   PB portion: The same as step 3
   Specification: The same measured DC level as step 3

Measurement point	Adjustment point (A38 : DEMO BAL/ETC. VR)
TP508/DM-123 (N-1)	SV TAPE SPEED OFFSET
TP503/DM-123 (M-1)	VAR DEEMP-Y
TP703/DM-123 (K-1)	VAR DEEMP-C

8. Remove the shorting clip between TP501/DM-123(K-1) and E103/DM-123(L-1).
9. To exit A38 : DEMO BAL/ETC. VR, press the F6 (EXIT) button once.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RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP109
TP309
TP503
TP111
TP302
TP310
RV506
TP502
TP508
TP110
TP102
TP305
TP105
RV302
RV304
RV303
RV301
E302
RV102
RV104
E102
RV101
RV311
RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
RV110
TP106
TP107
E701
TP901
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101

(Board No.suffix -15, 17) (Board No.suffix -18 and higher)

DM-123 Board (Side A)

2. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

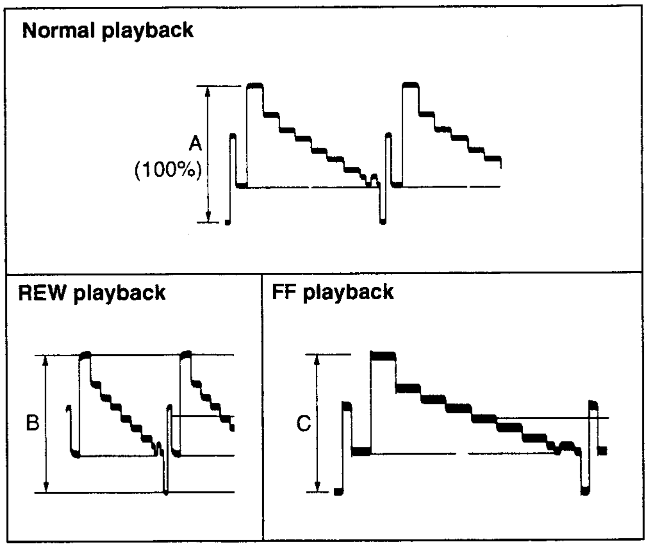
2. Exit the maintenance mode.

3. Gain Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP506/DM-123(K-1), DC 1 V/DIV
   GND: E503/DM-123(K-1)
   TIME: 10 µs/DIV
2. Play back the alignment tape in PLAY mode, then measure the level of A on the oscilloscope.
   PB portion: 75 % color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Use this measured level A as a reference level 100% (0 dB).
3. Play back the alignment tape in the following the playback mode, adjust the level of B on the oscilloscope.
   PB portion: The same as step 2
   NTSC model: REW playback
   PAL model: FF playback
   Adj. point: ●RV506/DM-123(N-1)
   Specification (Level in Normal PB is 100% {0 dB}.):
   NTSC model: B = 100 ±3 % (0 ±0.2 dB)
   PAL model: B = 105 ±5 % (0.4 ±0.4 dB)
4. Play back the alignment tape in the following playback mode, then check level of C on the oscilloscope.
   PB portion: The same as step 2
   NTSC model: FF playback
   PAL model: REW playback
   Specification (Level in Normal PB is 100% {0 dB}.):
   C = 100 ± 10 % (0 ± 1.0 dB)
5. Stop the playback of the alignment tape.

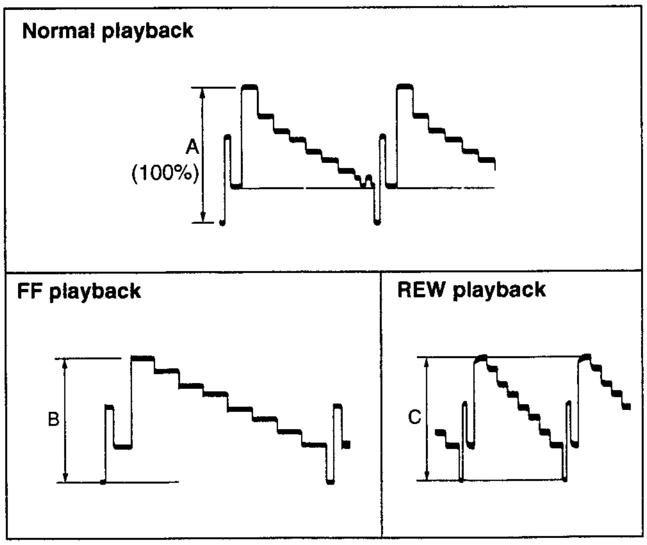
NTSC model Specifications

Playback mode	Specification for NTSC model (Level A in normal speed is 100% {0 dB}.)
REW	Adjust: B = 100 ±3 % (0 ±0.2 dB)
FF	Check: C = 100 ±10 % (0 ±1.0 dB)



PAL model Specifications

Playback mode	Specification for PAL model (Level A in normal speed is 100% {0 dB}.)
FF	Adjust: B = 105 ±5 % (0.4 ±0.4 dB)
REW	Check: C = 100 ±10 % (0 ±1.0 dB)



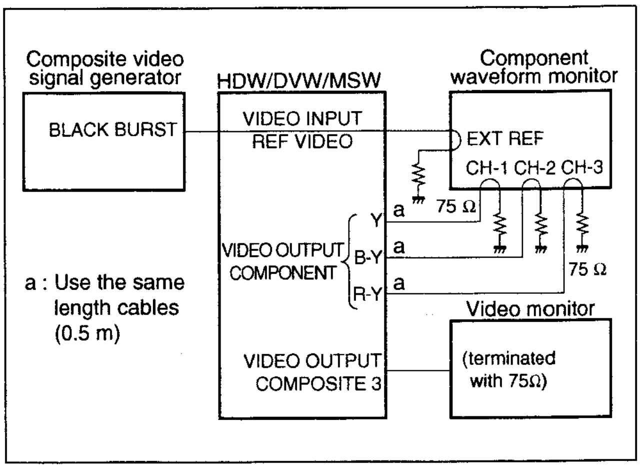
8-7-18. Component Output Level Adjustment

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS
- 75 Ω terminators (4 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
HDW/DVW/MSW
Component waveform monitor
BLACK BURST
VIDEO INPUT
REF VIDEO
EXT REF
CH-1 CH-2 CH-3
a
75 Ω
Y
VIDEO OUTPUT COMPONENT
B-Y
a
R-Y
a
75 Ω
a : Use the same length cables (0.5 m)
Video monitor
(terminated with 75Ω)
VIDEO OUTPUT COMPOSITE 3

Connection

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

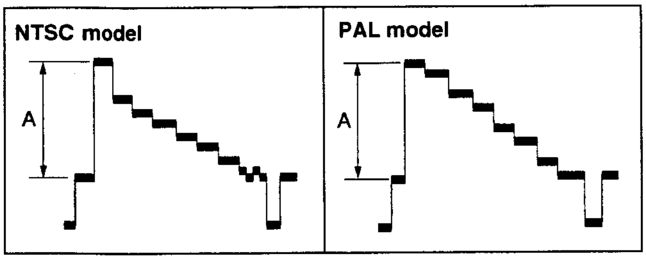
1. Enter the Maintenance Mode

1. Enter the maintenance mode.
2. Enter A41 : LVL/IMP/PHASE VR.
   Maintenance mode → M1 : ADJUST → A4 : BETA-CAM PB (TBC) → A41 : LVL/IMP/PHASE VR

2. METAL Y/C Check

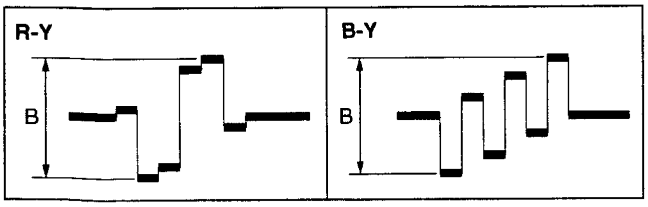
(METAL Y)

1. Watch the Y output signal on the analog component waveform monitor.
2. Play back the alignment tape in PLAY mode, then check the white level of signal.
   If it is out of the specification, adjust it.
   PB portion: 75 % color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Adj. point: A41 : LVL/IMP/PHASE VR : AD LEVEL METAL-Y
   Specification:
   NTSC model: A = 714 ±7 mV (100 ± 1 IRE)
   PAL model: A = 700 ±7 mV



(METAL C)

3. Watch the R-Y and B-Y signals on the analog component waveform monitor.
4. Play back the alignment tape in PLAY mode, then check the levels of R-Y and B-Y signals.
   If any level is out of the specification, adjust it.
   PB portion: The same as step 2
   Adj. point: A41 : LVL/IMP/PHASE VR : AD LEVEL METAL-C
   Specification: B = 700 ±7 mV p-p

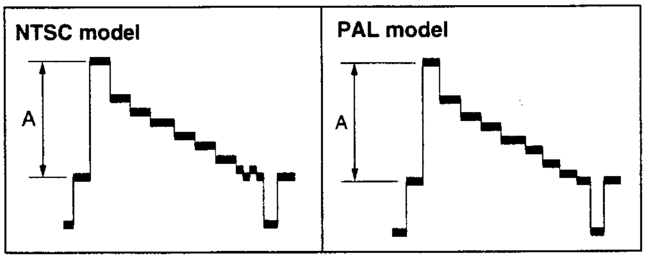


5. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

3. OXIDE Y/C Check

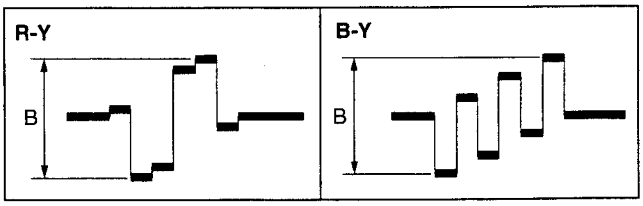
(OXIDE Y)

1. Watch the Y output signal on the analog component waveform monitor.
2. Play back the alignment tape in PLAY mode, then check the white level of signal.
   If the specification is not satisfied, adjust it.
   PB portion: 75% color-bar signal (0:00 to 3:00) of CR5-2A / CR5-2A PS
   Adj. point: A41 : LVL/IMP/PHASE VR : AD LEVEL OXIDE-Y
   Specification:
   NTSC model: A = 714 ±7 mV (100 ± 1 IRE)
   PAL model: A = 700 ±7 mV



(OXIDE C)

3. Watch the R-Y and B-Y signals on the analog component waveform monitor.
4. Play back the alignment tape in PLAY mode, then check the levels of R-Y and B-Y signals.
   If any level is out of the specification, adjust it.
   PB portion: The same as step 2
   Adj. point: A41 : LVL/IMP/PHASE VR : AD LEVEL OXIDE-C
   NTSC model: B = 700 ±7 mV p-p
   PAL model: B = 525 ±5 mV p-p



5. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

4. Saving the Data

1. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

8-7-19. VCO Lock-in Range Adjustment

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Extension board: EX-739
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS

Preparation

1. Extend the DM-123 board with an extension board EX-739.

Note

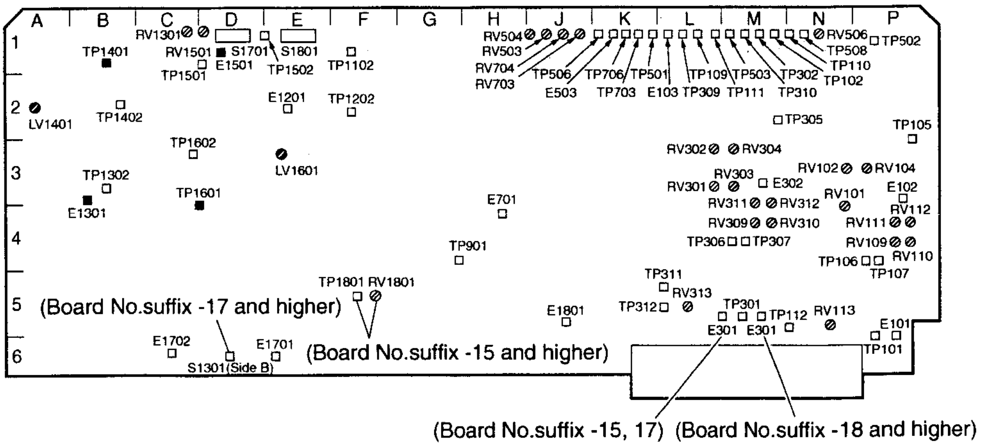
Before removing the DM-123 board, turn off the power.

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

Adjustment

1. Connect and set the oscilloscope as follows:
   CH-1: TP1401/DM-123(B-1), DC 1 V/DIV
   GND: E1301/DM-123(B-3)
   CH-2: TP1601/DM-123(C-3), DC 1 V/DIV
   GND: E1501/DM-123(D-1)
2. Play back the alignment tape in PLAY mode, then adjust each DC level of Y and C.
   PB portion: 75 % color-bar signal (14:00 to 17:00) of CR5-1B / CR5-1B PS
   Adj. points: Y (CH-1): ⊘LV1401/DM-123(A-2)
   C (CH-2): ⊘LV1601/DM-123(E-3)
   Specification: 2.3 ±0.2 V dc
3. Stop the playback of the alignment tape.


A
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5
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RV1301
TP1401
RV1501
S1701
S1801
E1501
TP1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
E701
TP901
TP1801 RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
(Board No.suffix -15 and higher)
E1801
RV504
RV503
RV704
RV703
TP506
TP706
TP501
TP109
TP503
TP302
E503
TP703
E103
TP309
TP111
TP310
RV506
TP502
TP508
TP110
TP102
TP305
TP105
RV302
RV304
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RV301
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RV312
RV112
RV309
RV310
RV111
TP306
TP307
RV109
TP106
RV110
TP107
TP311
RV313
TP312
TP301
TP112
RV113
E301
E301
E101
TP101
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-20. TBC VCO Free-running Adjustment

Note

Perform this adjustment only in the following case:
(This adjustment is unnecessary in other cases.)

- When the RV1301 on the DM-123 board is replaced.
- When the RV1301 on the DM-123 board is unintentionally turned.

After performing this adjustment, carry out all adjustments of Section 8-7-21 through Section 8-7-28.

Tools

- Analog composite video monitor

  Note

  Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.
- Alignment tape

  For NTSC model: CR5-1B

  For PAL model: CR5-1B PS

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

Adjustment

1. Play back the alignment tape in VARIABLE ×1 mode, then check that the Y DO and C DO parts of playback picture (displaying color-bar) is clearly appeared with no drop-out.

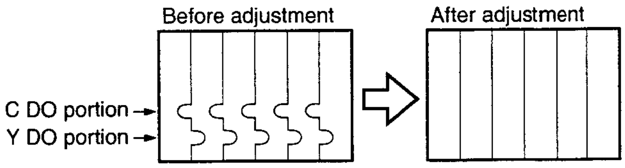
   If drop-out is appeared, adjust the following RVs.

   PB portion: Color-bar signal with the drop-out (26:00 to 28:00) of CR5-1B / CR5-1B PS

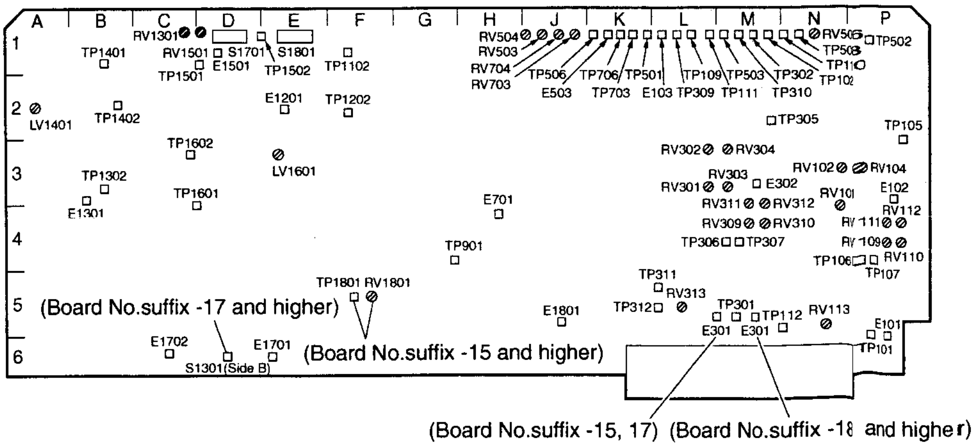
   Adj. points: Y DO: ⊘RV1301/DM-123(C-1)

   C DO: ⊘RV1501/DM-123(D-1)

   Specification: No drop-out (on C DO and Y DO)


Before adjustment
After adjustment
C DO portion
Y DO portion

2. Stop the playback of the alignment tape.


A
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4
5
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RV1301
TP1401
RV1501
S1701
S1801
E1501
TP1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
RV504
RV503
RV704
RV703
TP506
E503
TP706
TP703
TP501
E103
TP109
TP309
TP503
TP111
TP302
TP310
RV505
TP502
TP508
TP110
TP102
TP305
TP105
RV302
RV304
RV102
RV104
RV303
RV301
E302
RV101
E102
RV311
RV312
RV112
RV309
RV310
RV111
RV109
TP306
TP307
TP106
RV110
TP107
E701
TP901
TP1801
RV1801
TP311
RV313
TP312
TP301
TP112
RV113
E1801
E301
E301
E101
TP101
E1702
E1701
S1301(Side B)
(Board No.suffix -17 and higher)
(Board No.suffix -15 and higher)
(Board No.suffix -15, 17)
(Board No.suffix -18 and higher)

DM-123 Board (Side A)

8-7-21. FAST VCO Tracking Adjustment

Note

Perform this adjustment in the 50 Hz or 625 mode.

Tools

- Analog composite video monitor
- Alignment tapes: CR5-1B PS and CR5-2A PS

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

For HDW/MSW NTSC model: Switching the Operation Mode

1. Switch the setting of the setup menu to the following mode. (Refer to the operation manual.)

Setup menu	Mode
ITEM-013	⇨ 50 Hz or 625

2. Set the analog composite monitor to the PAL mode.

Adjustment

1. Enter the maintenance mode.
2. Enter A42 : YC DL/Y TR VR.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A42 : YC DL/Y TR VR
3. Check that the specified initial data is set for the following item.

Item (A4 : BETACAM PB (TBC)	Initial data
A42 : YC DL/Y TR VR Y TR OFFSET	A0

4. Play back the alignment tape in FF mode and REW mode, then check that the picture (color-bar) displays on the video monitor.
   PB portion: 75 % color-bar signal (14:00 to 17:00) of CR5-1B PS
5. Play back the alignment tape in SHUTTLE −24 time speed, then check that the vertical lines of picture (color-bar) on the video monitor displays straight.
   If vertical lines are not straight, adjust the following items:
   PB portion: The same as step 4
   Adj. point: A42 : YC DL/Y TR VR : Y TR OFFSET
   Specification: The fluction of vertical lines of picture (color-bar) is minimum.
6. During play back the alignment tape in range from VARIABLE _10 time speed to fastest + speed, check that the vertical lines of picture (color-bar) on the video monitor displays straight.
   If vertical lines are not straight, adjust the following items:
   PB portion: The same as step 4
   Adj. point: A42 : YC DL/Y TR VR : Y TR OFFSET
   Specification: The fluction of vertical lines of picture (color-bar) is minimum.
7. To exit A42 : YC DL/Y TR VR, press the F6 (EXIT) button once.
8. Eject the alignment tape.

Saving the Data

Perform the following steps only when the data value of "Y TR OFFSET" in A42 : YC DL/Y TR VR was changed.

9. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.
10. Exit the maintenance mode.
11. Play back the alignment tape in FF mode and REW mode, then check that the picture (color-bar) displays on the video monitor.
    PB portion: 75 % color-bar signal (0:00 to 3:00) of CR5-2A PS
12. Eject the alignment tape.

13. For HDW/MSW series:
    Reset the setting of the setup menu ITEM-013 to the original mode. (NTSC model only)
14. Reset the analog composite video monitor to the original mode. (NTSC model only)

8-7-22. PB Video Phase Adjustment

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog component video signal generator:
  For NTSC model:
  Tektronix TSG-300 or equivalent
  For PAL model:
  Tektronix TSG-371 or equivalent

Note

It is required that the component video signal generator is able to output the 50% bowtie signal.

- Analog composite waveform/vector monitor:
  For NTSC model:
  Tektronix 1750A, or equivalent
  For PAL model:
  Tektronix 1751A, or equivalent
- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS
- 75 Ω terminators (5 pieces)

Preparation

1. Reattach of the DM-123 board without the extension board.

Do not use the extension board in this adjustment.

Note

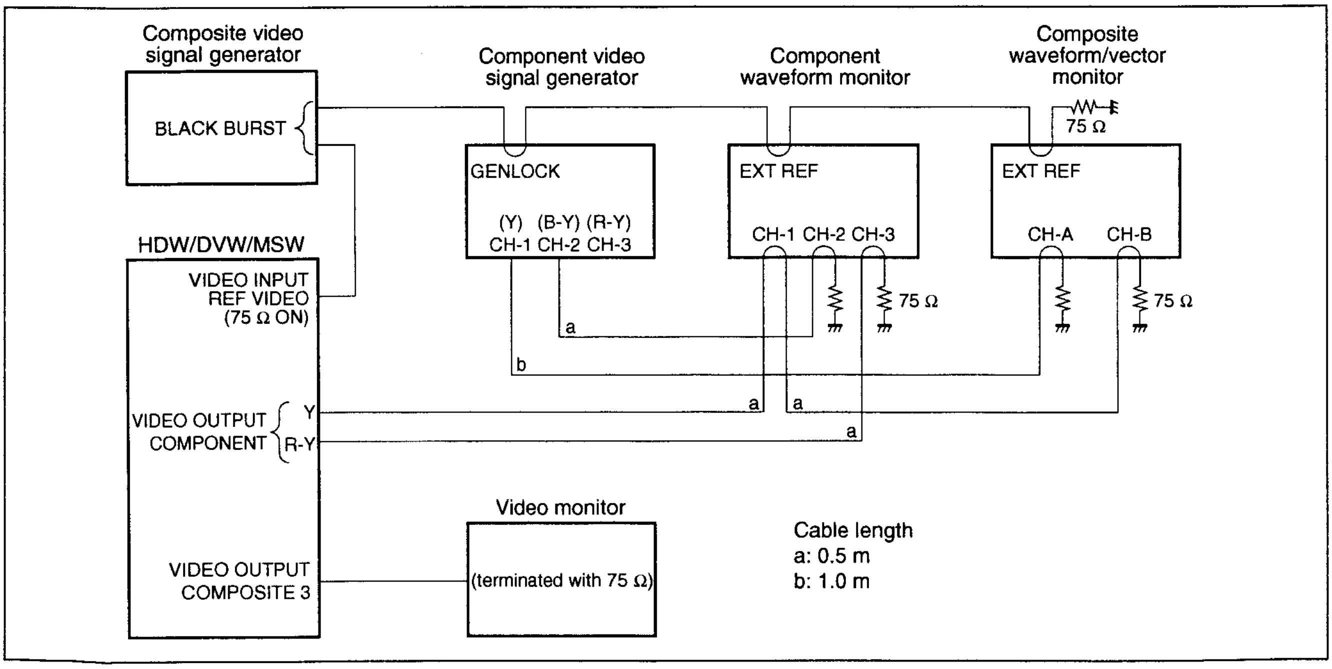
Before removing the board, turn off the power.

2. Connect the equipment.

(Refer to Figure "Connection".)
Set a output of the analog component video signal generator to 50% bowtie signal.

3. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).


Composite video signal generator
BLACK BURST
Component video signal generator
GENLOCK
(Y) (B-Y) (R-Y)
CH-1 CH-2 CH-3
Component waveform monitor
EXT REF
CH-1 CH-2 CH-3
Composite waveform/vector monitor
EXT REF
CH-A CH-B
75 Ω
75 Ω
75 Ω
HDW/DVW/MSW
VIDEO INPUT
REF VIDEO
(75 Ω ON)
VIDEO OUTPUT COMPONENT Y
R-Y
VIDEO OUTPUT COMPOSITE 3
a
b
a
a
a
Video monitor
(terminated with 75 Ω)
Cable length
a: 0.5 m
b: 1.0 m

Connection

1. Check the Initial Data

Note

Perform the initial data check only when the DM-123 board or NV-RAM (IC1805/DM-123) was replaced.

1. Enter the maintenance mode.
2. Enter A40 : TBC IC DATA.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A40 : TBC IC DATA
3. Ensure that the data "SQ Y RZ" in the submenu is the following data value.

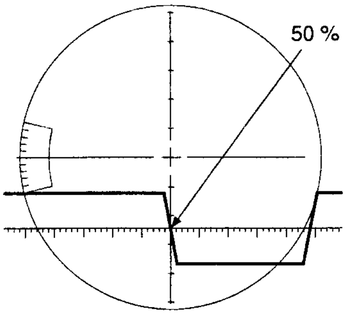
A40 : TBC IC DATA	Model	Initial data
SQ Y RZ	NTSC	46
	PAL	45

4. Exit the maintenance mode.

2. Set the System SYNC Position/Phase

1. Set the composite waveform/vector monitor as follows:
   WAVEFORM mode, SWEEP: 2H, MAG ON,
   INPUT: CH-A, EXT REF
2. Display the H SYNC part of CH-A on the composite waveform/vector monitor, and align 50 % position at falling edge readability. (See Figure in step 4.)
3. Change the watching signal (channel) on composite waveform/vector monitor to CH-B.
4. Play back the alignment tape in PLAY mode, then adjust the 50 % position at falling edge of the H SYNC of CH-B to the identical position as CH-A using the F1(SYNC) of the function menu Page3.
   PB portion: 50 % bowtie signal (17:00 to 19:00) of CR5-1B / CR5-1B PS

Composite waveform/vector monitor (WAVEFORM mode)



5. Stop the playback of the alignment tape.
6. Set the composite waveform/vector monitor as follows:
   SCH mode, INPUT: CH-A, EXT REF
7. Align the SYNC phase of CH-A to 0 degree using the PHASE knob of the composite waveform/vector monitor. (See Figure in step 9.)

   Note

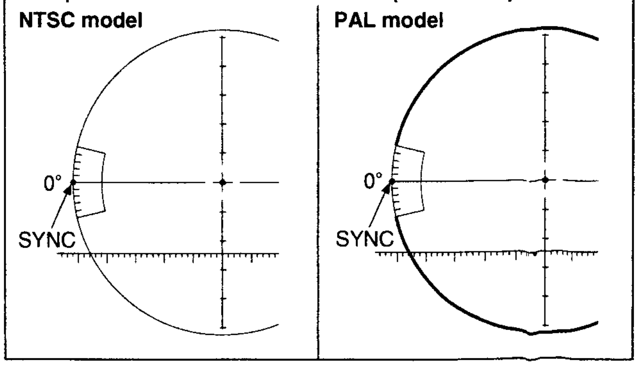
   Turn the PHASE knob so that the beam spot (SYNC) moves in the shortest route to 0 degree.

8. Change the watching signal (channel) on the composite waveform/vector monitor from CH-A to CH-B.
9. Play back the alignment tape in PLAY mode, then adjust the SYNC (beam spot) of CH-B to 0 degree (the identical position as CH-A) using the F2(SC) of the function menu Page3.
   PB portion: The same as step 4

   Note

   Turn the MULTI CONTROL knob so that the beam spot (SYNC) moves in the shortest route to 0 degree.

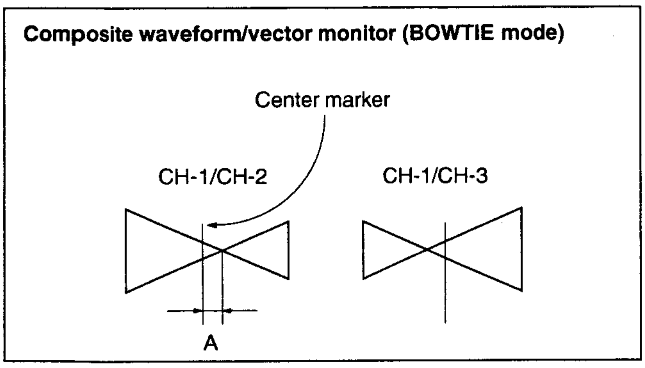
Composite waveform/vector monitor (SCH mode)



10. Stop the playback of the alignment tape.

3. Y Phase Adjustment

1. Set the component waveform monitor to BOWTIE mode.
2. Enter the maintenance mode.
3. Enter A41 : LVL/IMP/PHASE VR.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A41 : LVL/IMP/PHASE VR
4. Play back the alignment tape in PLAY mode, then adjust the deviation between the center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y).
   PB portion: 50% bowtie signal (17:00 to 19:00) of CR5-1B / CR5-1B PS
   Adj. point: A41 : LVL/IMP/PHASE VR : VIDEO PH
   Specification: A = 0 ± 10 ns
   If the specification is not satisfied by adjustment, perform steps (1) through (7), before readjusting.


Composite waveform/vector monitor (BOWTIE mode)

Perform the following steps (1) through (7) only when the result of step 4 was out of the specification.

(1) To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.
(2) Enter A40 : TBC IC DATA.
(3) Restart the playback of alignment tape from the top of PB portion in PLAY mode.
    PB portion: 50% bowtie signal (17:00 to 19:00) of CR5-1B / CR5-1B PS
(4) Change the data value "SQ Y RZ" in A40 : TBC IC DATA within +1 or −1 so that the bowtie dip point moves closer to the center marker.
    And make a note of the changed data value.
(5) To exit A40 : TBC IC DATA, press the F6 (EXIT) button once.
(6) Enter A41 : LVL/IMP/PHASE VR.
(7) Perform step 4 of this adjustment again.

5. To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.
6. Stop the playback of the alignment tape.

4. Saving the Data

1. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

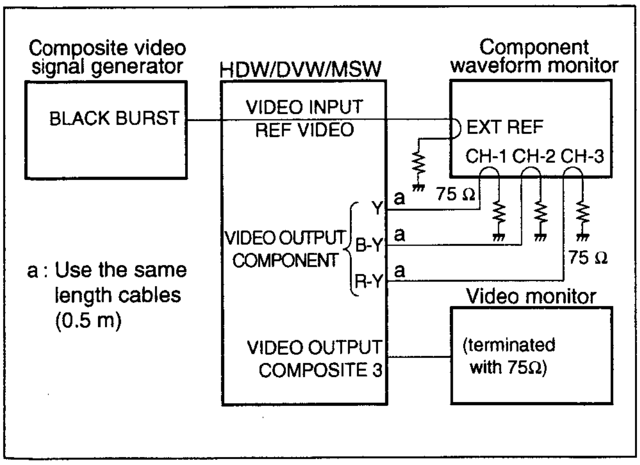
8-7-23. TBC Y/C Delay Rough Adjustment

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS
- 75 Ω terminators (4 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
BLACK BURST
HDW/DVW/MSW
VIDEO INPUT
REF VIDEO
Component waveform monitor
EXT REF
CH-1 CH-2 CH-3
75 Ω
VIDEO OUTPUT COMPONENT
Y
B-Y
R-Y
a
a
a
75 Ω
a : Use the same length cables (0.5 m)
Video monitor
VIDEO OUTPUT COMPOSITE 3
(terminated with 75Ω)

Connection

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

---

1. Check the Initial Data

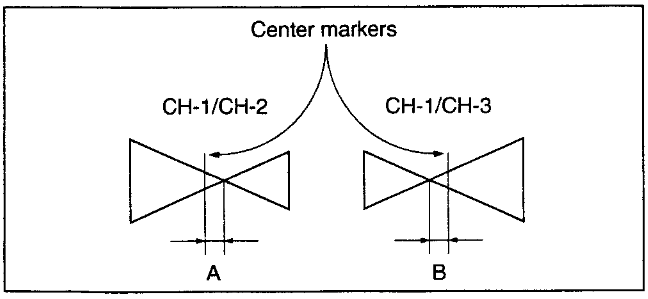
1. Enter the maintenance mode.
2. Enter A40 : TBC IC DATA.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A40 : TBC IC DATA
3. When the DM-123 board or NV-RAM (IC1805/DM-123) was replaced only, ensure that the data “SQ C RZ” in A40 : TBC IC DATA is the following data value.

A42 : TBC IC DATA	Model	Initial data
SQ C RZ	NTSC	6B
	PAL	6A

4. To exit A40 : TBC IC DATA, press the F6 (EXIT) button once.

2. Adjustment

1. Set the component waveform monitor to BOWTIE mode.
2. Enter A42 : YC DL VR (in NTSC model) or YC DL/Y TR VR (in PAL model).
3. Start the playback of alignment tape from the top of PB portion in PLAY mode.
   PB portion: 50% bowtie signal (17:00 to 19:00) of CR5-1B / CR5-1B PS
4. Adjust the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. points: Field 1: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-A
   Field 2: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-B
   Specifications: A = 0 ±10 ns, B = 0 ±10 ns
5. Adjust difference of deviations between each center marker and bowtie dip points of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. point: ⊘RV1501/DM-123(D-1)
   Specification: A − B = 0 ±10 ns


Center markers
CH-1/CH-2
CH-1/CH-3
A
B

If the specification in steps 4 and 5 is not satisfied only, perform following steps (1) through (7)

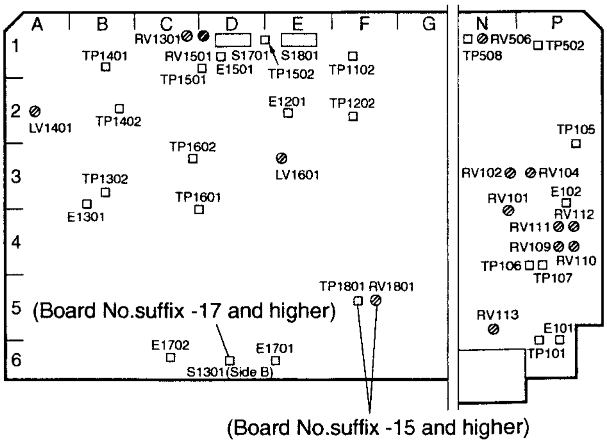
(1) To exit A42, press the F6 (EXIT) button once.
(2) Enter A40 : TBC IC DATA.
(3) Restart the playback of alignment tape from the top of PB portion in PLAY mode.
   PB portion: The same as step 2
(4) Change the data value "SQ C RZ" in A40 : TBC IC DATA within +2 or −2 so that the bowtie dip points move closer to center markers.
   And make a note of the changed data value.
(5) To exit A40 : TBC IC DATA, press the F6 (EXIT) button once.
(6) Enter A42 : YC DL VR (in NTSC model) or YC DL/Y TR VR (in PAL model).
(7) Perform steps 4 and 5 again.

6. To exit A42, press the F6 (EXIT) button once.
7. Stop the playback of the alignment tape.

3. Saving the Data

1. Enter A3F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.


A
B
C
D
E
F
G
N
P
1
2
3
4
5
6
RV1301
RV1501
S1701
S1801
TP1401
TP1501
E1501
TP1502
TP1102
E1201
TP1202
LV1401
TP1402
TP1602
LV1601
TP1302
TP1601
E1301
TP1801
RV1801
(Board No.suffix -17 and higher)
E1702
E1701
S1301(Side B)
RV506
TP502
TP508
TP105
RV102
RV104
RV101
E102
RV112
RV111
RV109
RV110
TP106
TP107
RV113
E101
TP101
(Board No.suffix -15 and higher)

DM-123 Board (Side A)

8-7-24. Impact Error Offset Adjustment

Tools

- Analog composite video monitor
- Alignment tape

For NTSC model:	CR5-1B	(Part No. 8-960-096-41)
For PAL model:	CR5-1B PS	(Part No. 8-960-096-91)

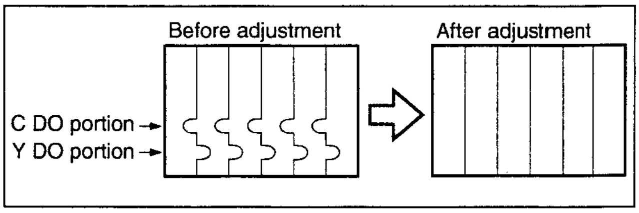
Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

Adjustment

1. Start the playback of alignment tape in PLAY mode.
   PB portion: Color-bar signal with the drop-out (26:00 to 28:00) of CR5-1B / CR5-1B PS
2. Check that the Y DO and C DO parts of playback picture (displaying color-bar) appears clearly with no drop-out.
   If drop-out is appeared, adjust the following items.
   Adj. points: Y DO: A41 : LVL/IMP/PHASE VR : IMP OFFSET-Y
   C DO: A41 : LVL/IMP/PHASE VR : IMP OFFSET-C
   Specification: No drop-out (on C DO and Y DO)



3. To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.
4. Stop the playback of the alignment tape.

Saving the Data

5. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

6. Exit the maintenance mode.

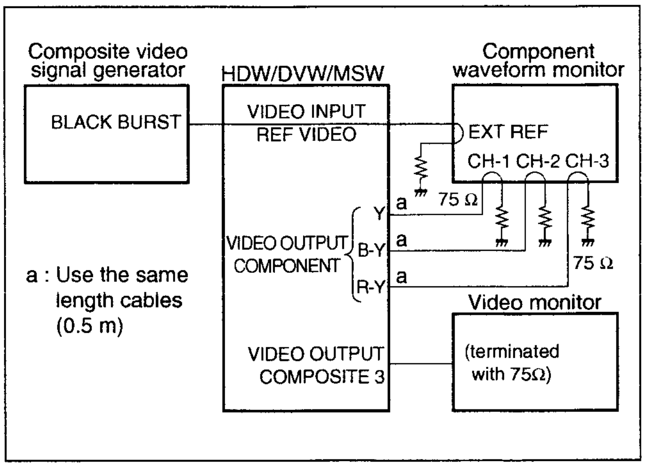
8-7-25. TBC Y/C Delay Adjustment

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog component waveform monitor:
  Tektronix WFM300A or equivalent
- Analog composite video monitor
- Alignment tapes
  For NTSC model: CR5-1B and CR5-2A
  For PAL model: CR5-1B PS and CR5-2A PS
- 75 Ω terminators (4 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
BLACK BURST
HDW/DVW/MSW
VIDEO INPUT
REF VIDEO
VIDEO OUTPUT COMPONENT
Y
B-Y
R-Y
VIDEO OUTPUT COMPOSITE 3
Component waveform monitor
EXT REF
CH-1 CH-2 CH-3
75 Ω
75 Ω
a
a
a
Video monitor
(terminated with 75Ω)
a : Use the same length cables (0.5 m)

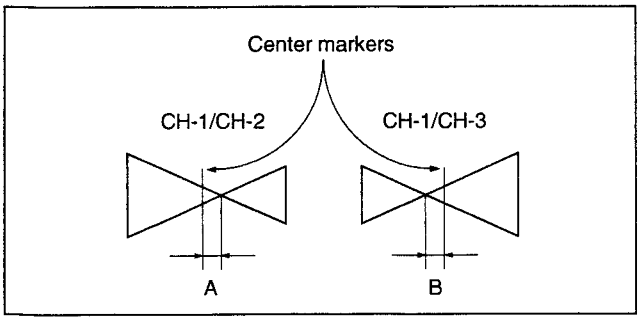
Connection

2. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more).

1. METAL Adjustment

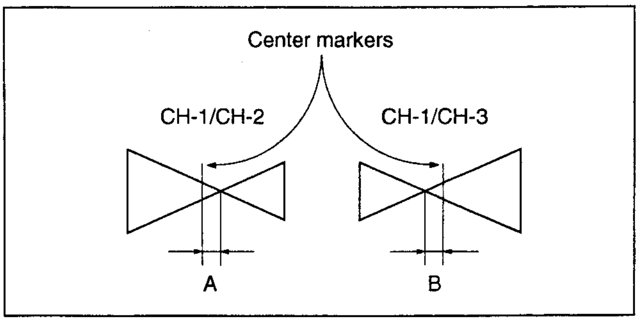
1. Set the component waveform monitor to BOWTIE mode.
2. Enter the maintenance mode.
3. Enter A42 : YC DL VR (in NTSC model) or YC DL/Y TR VR (in PAL model).
   Maintenance mode → M1 : ADJUST → A4 : BETA-CAM PB (TBC) → A42 : YC DL VR or YC DL/Y TR VR
4. Start the playback of alignment tape in PLAY mode.
   PB portion: 50% bowtie signal (17:00 to 19:00) of CR5-1B / CR5-1B PS
5. Adjust the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. points: Field 1: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-A
   Field 2: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY M-B
   Specifications: A = 0 ±10 ns
   B = 0 ±10 ns



6. Eject the alignment tape. (F5 ⇨ EJECT ⇨ F6)

2. OXIDE Adjustment

1. Start the playback of alignment tape in PLAY mode.
   PB portion: 50% bowtie signal (6:00 to 9:00) of CR5-2A / CR5-2A PS
2. Adjust the deviations A and B between each center marker and bowtie dip point of CH-1/CH-2 (Y/B-Y) and CH-1/CH-3 (Y/R-Y).
   Adj. points: Field 1: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY O-A
   Field 2: A42 : YC DL VR or YC DL/Y TR VR: Y/C DELAY O-B
   Specifications: A = 0 ±10 ns
   B = 0 ±10 ns



3. To exit A42 : YC DL VR or YC DL/Y TR VR, press the F6 (EXIT) button once.
4. Eject the alignment tape.

3. Saving the Data

1. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

2. Exit the maintenance mode.

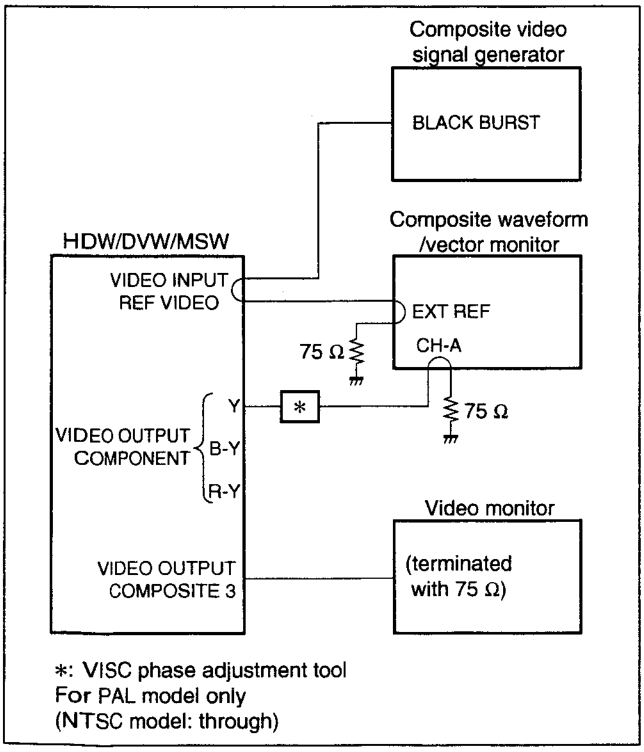
8-7-26. VISC Phase Adjustment

Tools

- Analog composite video signal generator
  For NTSC model:
  Tektronix TSG-130A or equivalent
  For PAL model:
  Tektronix TSG-131A or equivalent
- Analog composite waveform/vector monitor:
  For NTSC model:
  Tektronix 1750A, or equivalent
  For PAL model:
  Tektronix 1751A, or equivalent
- Analog composite video monitor
- VISC phase adjustment tool (For PAL model only)
- Alignment tape
  For NTSC model: CR5-1B
  For PAL model: CR5-1B PS
- 75 Ω terminators (2 pieces)

Preparation

1. Connect the equipment.


Composite video signal generator
BLACK BURST
HDW/DVW/MSW
Composite waveform /vector monitor
VIDEO INPUT
REF VIDEO
EXT REF
CH-A
75 Ω
75 Ω
Y
B-Y
R-Y
VIDEO OUTPUT COMPONENT
*
Video monitor
(terminated with 75 Ω)
VIDEO OUTPUT COMPOSITE 3
*: VISC phase adjustment tool
For PAL model only
(NTSC model: through)

Connection

2. Conditions to be kept are:

- Settings for adjustment (Refer to Section 8-7-2.)
- Warming up of equipment to be used (20 minutes or more)

1. Check the Initial Data

Perform the initial data check only when the DM-123 board or NV-RAM (IC1805/DM-123) was replaced.

1. Enter the maintenance mode.
2. Enter A40 : TBC IC DATA.
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC) → A40 : TBC IC DATA
3. Check that the data of submenu VISC PHASE is the following data value.

A40 : TBC IC DATA	Model	Initial data
VISC PHASE	NTSC	02
	PAL	04

4. Exit the maintenance mode.

2. Adjustment

1. Set the composite waveform/vector monitor as follows:
   SCH mode, INPUT: CH-A, EXT REF
2. Start the playback of alignment tape from the top of PB portion in PLAY mode.
   PB portion: H sweep signal with VISC signal
   (28:00 to 30:00) of
   CR5-1B / CR5-1B PS

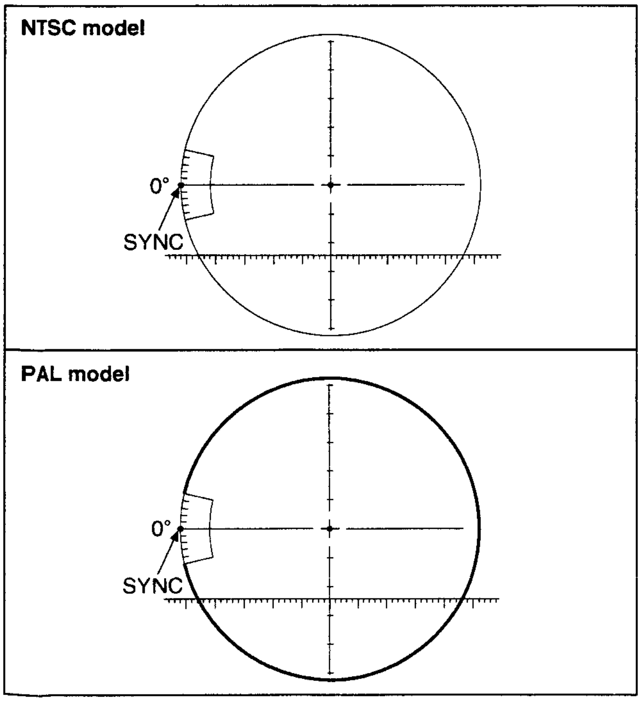
   Note

   To confirm that the specifications are satisfied in step 8 within two minutes after starting the playback, be sure to complete the working in a short time.
   If the playback signal is changed another on steps to step 9, return to step 2 and restart.

3. Set the F1 (CAPSTN) of the function menu page4 as follows, then return it to 2F after 2 seconds.
   NTSC model: 4F
   PAL model: 8F
4. Set the SYNC to 0 degree using PHASE control knob of the composite waveform/vector monitor.

   Note

   Turn the PHASE control knob so that the beam spot (SYNC) moves in the shortest route to 0 degree.


NTSC model

PAL model

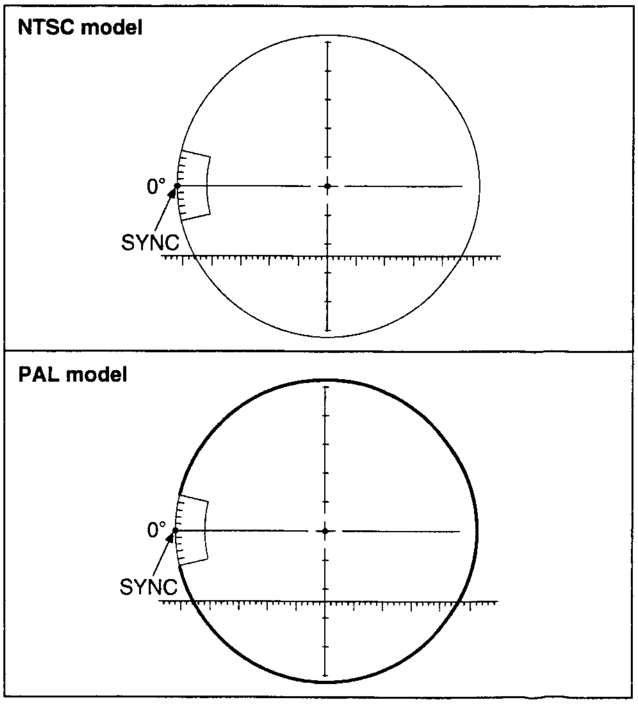
Composite waveform/vector monitor (SCH mode)

5. Set the composite waveform/vector monitor as follows:
   NTSC model:
   VECTOR mode, Line select: 11, EXT REF
   PAL model:
   VECTOR mode, Line select: 8, EXT REF
6. Align the center position of VISC (beam spot) to 0 degree with PHASE knob of the composite waveform/vector monitor.

   Note

   Turn the PHASE knob so that the beam spot (VISC) moves in the shortest route to the specified position.

7. Set the F1 (CAPSTN) of the function menu Page4 as follows:
   NTSC model: 4F, PAL model: 8F
8. Adjust the center position of VISC (beam spot).
   Adj. point: A41 : LVL/IMP/PHASE VR : VISC PH
   Specifications: Center of beam spot: 0 ± 5°
   Jitters of beam spot: 0 ± 15°
   If the specification is not satisfied, readjust after performing steps (1) through (6) below.


NTSC model

PAL model

Composite waveform/vector monitor (VECTOR mode)

If the specification in step 8 is not satisfied only, perform steps (1) through (6).

(1) To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.
(2) Enter A40 : TBC IC DATA.
(3) Change the data value of item "VISC PHASE" within +1 or −1 so that the center of VISC (beam spot) moves closer to 0 degree.
(4) To exit A40 : TBC IC DATA, press the F6 (EXIT) button once.
(5) Enter A41 : LVL/IMP/PHASE VR.
(6) Perform step 8 again.

9. To exit A41 : LVL/IMP/PHASE VR, press the F6 (EXIT) button once.
10. Eject the alignment tape.

Saving the Data

11. Enter A4F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data saving is completed normally.

12. Exit the maintenance mode.

8-7-27. Data Setting (HDW/MSW Alternative Mode)

Notes

- Perform the data setting (Alternative mode) after completing all the analog Betacam playback adjustments (Sections 8-7-3 through 8-7-26).

Model	Standard mode	Alternative mode
NTSC	59.94 Hz or 525	50 Hz or 625
PAL	50 Hz or 625	59.94 Hz or 525

Tool

- Analog composite video monitor

1. Confirmation of the Data (in Standard Mode)

Note

"1. Confirmation of the Data" is required only in the following cases:

- When the DM-123 board was replaced
- When the NV-RAM (IC1805) on the DM-123 board was replaced

Start from "2. Data Settings" unless the above cases.

1. Enter the maintenance mode.
2. A4 : BETACAM PB (TBC).
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC)
3. Check each data value of the sub-menu A40 through A42, then fill up them to the table ② on the next page.
4. Exit the maintenance mode.

2. Data Settings (in Alternative Mode)

1. Switch the setting of the setup menu to the following mode. (Refer to the operation manual.)

Setup menu	Mode
ITEM-013	NTSC model ⇨ 50 Hz or 625
	PAL model ⇨ 59.94 Hz or 525

2. Set the analog composite video monitor to PAL mode (for NTSC model)/NTSC mode (for PAL model).
3. Enter the maintenance mode.
4. Enter A3 : BETACAM PB (DM).
5. Set the data of alternative mode in the following table ① to each item of sub-menus A31 to A34.

Perform the step 6 and 7 only when the DM-123 board or NV-RAM (IC1805/DM-123) was replaced.

6. Enter A4 : BETACAM PB (TBC).
   Maintenance mode → M1 : ADJUST → A4 : BETACAM PB (TBC)
7. Calculate the data value for the alternative mode, based on the following table ② and the value checked in the standard mode.
   Then set the calculated data value to each item of the sub-menus A40 through A42.
   Examples:
   - When A40 : TBC IC DATA ; "SQ-Y RZ"
     Example for NTSC model:
     When the standard mode data is 46 ;
     the alternative mode data is 46 − 1 = 45
     Example for PAL model:
     When the standard mode data is 46 ;
     the alternative mode data is 46 + 1 = 47
   - When A41 : LVL/PHASE VR ; "AD LEVEL METAL-Y"
     When the standard mode data is 8A ;
     the alternative mode data is $8A_H + 11_H = 9B_H$

3. Saving the Data

1. Enter A4F : NV-RAM CONTROL , then execute "SAVE ALL ADJUST DATA".
   - "Save Complete" will be displayed when the data saving has been completed normally.
2. Exit the maintenance mode.
3. Reset the settings of the switches and menu to the customer settings. (Refer to Section 8-7-2.)
4. Reset the analog composite video monitor to original mode.

Setting data value (HDW/MSW Alternative mode)

① A3 : BETACAM PB (DM) Setting

Item (A3 : BETACAM PB (DM))	Monitor	Menu display	NTSC model in 50 Hz or 625	PAL model in 59.94 Hz or 525
A31 : COS EQ VR (METAL)	EQ1 METAL-Y-A	COS EQ MY - EQ1-MYA	7D	86
	EQ1 METAL-Y-B	COS EQ MY - EQ1-MYB	7D	86
	SUB METAL-Y-A	COS EQ MY - MAIN-MYA	B0	60
	SUB METAL-Y-B	COS EQ MY - MAIN-MYB	B0	60
	EQ1 METAL-Y-A	COS EQ MY - EQ1-MYA	8A	6D
	EQ1 METAL-Y-B	COS EQ MY - EQ1-MYB	8A	6D
	SUB METAL-Y-A	COS EQ MY - MAIN-MYA	74	5A
	SUB METAL-Y-B	COS EQ MY - MAIN-MYB	74	5A
A32 : COS EQ VR (OXIDE)	EQ1 OXIDE-Y-A	COS EQ OY - EQ1-OYA	AC	8A
	EQ1 OXIDE-Y-B	COS EQ OY - EQ1-OYB	AC	8A
	SUB OXIDE-Y-A	COS EQ OY - SUB-OYA	95	9C
	SUB OXIDE-Y-B	COS EQ OY - SUB-OYA	95	9C
	EQ1 OXIDE-C-A	COS EQ OC - EQ1-OCA	9C	80
	EQ1 OXIDE-C-B	COS EQ OC - EQ1-OCB	9C	80
	SUB OXIDE-C-A	COS EQ OC - SUB-OCA	6E	71
	SUB OXIDE-C-B	COS EQ OC - SUB-OCA	6E	71
A33 : G-BAND VR	GUARD BAND METAL-Y	G-BAND - GBAND-MY	20	20
	GUARD BAND METAL-C	G-BAND - GBAND-MC	23	26
	GUARD BAND OXIDE-Y	G-BAND - GBAND-OY	1C	38
	GUARD BAND OXIDE-C	G-BAND - GBAND-OC	2B	3D
A34 : DO TH VR	DO TH METAL-Y	DO TH - DO TH-MY	22	18
	DO TH METAL-C	DO TH - DO TH-MC	25	1E
	DO TH OXIDE-Y	DO TH - DO TH-OY	30	30
	DO TH OXIDE-C	DO TH - DO TH-OC	33	35

② A4 : BETACAM PB (TBC) Setting

Item (A4 : BETACAM PB (TBC))	Monitor	Menu display	NTSC model in 50 Hz or 625	PAL model in 59.94 Hz or 525
A40 : TBC IC DATA	SQ-Y RZ	TBC DATA - SQ-Y RZ	(___*)−1 =___	(___*)+1 =___
	SQ-C RZ	TBC DATA - SQ-C RZ	(___*)−1 =___	(___*)+1 =___
A41 : LVL/PHASE VR	AD LEVEL METAL-Y	AD LEVEL - LEVEL-MY	(___*)+11H =___	(___*)+11H =___
	AD LEVEL METAL-C	AD LEVEL - LEVEL-MC	(___*)+49H =___	(___*)−2H =___
	AD LEVEL OXIDE-Y	AD LEVEL - LEVEL-OY	(___*)+16H =___	(___*)+5H =___
	AD LEVEL OXIDE-C	AD LEVEL - LEVEL-OC	(___*)+43H =___	(___*)−22H =___
	VIDEO PH	PHASE - VIDEO PH	(___*)±0 =___	(___*)±0 =___
NTSC model:	Y/C DELAY M-A	Y/C DELAY - Y/C MA	(___*)±0 =___	(___*)±0 =___
A42 : YC DL/Y TR VR	Y/C DELAY M-B	Y/C DELAY - Y/C MB	(___*)±0 =___	(___*)±0 =___
PAL model:	Y/C DELAY O-A	Y/C DELAY - Y/C OA	(___*)±0 =___	(___*)±0 =___
A42 : YC DL VR	Y/C DELAY O-B	Y/C DELAY - Y/C OB	(___*)±0 =___	(___*)±0 =___

* : Fill up the data value checked in the standard mode.

8-8. SDI/SDTI I/O System Adjustment

8-8-1. Adjustment Overview

In the electrical adjustments for the SDI/SDTI input/output, adjust each VCO free-running frequency for the decoders and encoders using the menu in the maintenance mode.
Usually perform the automatic adjustment of Section 8-8-2. If the manually adjustment is needed, refer to Section 8-8-3.

Note

For detail of each menu in the maintenance mode, refer to Section 3.

Tools

To perform the electrical adjustments for the SDI/SDTI input/output lines, prepare the following equipment (or equivalent) and fixtures.

Note

Manually adjustment is not needed when the automatic adjustment can be is performed in the VTR.

When performing the automatic adjustment

- Analog composite video monitor

When performing the manually adjustment

- Oscilloscope: Tektronix TDS460A
- Frequency counter: Advantest TR5821
- Analog composite video monitor

  Note

  This video monitor is for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Adjustments

Since above adjustment items can be adjusted independently of each other, no special order has been observed.

Line	Item	Adjustment point	Measurement point at manually adj.	
SDTI output [*1]	Encoder VCO free-running freq. adj.	A234 : SDTI ENC VCO	MSW: HDW (HKDW-102):	TP600/EPR-1 TP-200/DIF-134
SDTI input [*2]	Decoder VCO free-running freq. adj.	A234 : SDTI DEC VCO	MSW: HDW (HKDW-102):	TP501/EPR-1 TP-100/DIF-134
	Data saving	A2F : NV-RAM CONTROL		

*1: HDW series with HKDW-102
MSW series
*2: HDW-2000, D2000, S2000/P, M2000/P with HKDW-102
MSW-2000, A2000/P, M2000/P, M2000E/P

8-8-2. VCO Free-running Frequency Automatic Adjustment

Tool

- Analog composite video monitor

Note

This video monitor is for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Preparation

1. Check the setting of the function menu.

Page4: F4 (CHARA) ⇨ ON

2. Check that the VTR has warmed up.

Before starting the adjustment, warm up the VTR through the power for 10 minutes or more.

Automatic Adjustment

1. Enter the maintenance mode.
2. Enter A23 : CP VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A23 : CP VR
3. Enter the following specified sub menu.

HDW Recorder:	A231, A232, A234, and A235
HDW Player:	A231, A232, and A234
DVW Recorder:	A231 to A233
MSW Recorder:	A231 to A235
MSW Player:	A231, A232, and A234

Note

In this time, the adjustment mode is the manual, and "Manual" is displayed on the video monitor.

4. Change the adjustment mode to the automatic.

Note

How to change the adjustment mode from the manual to the automatic:
When there is the ∗-mark to ahead of "Manual", turn the MULTI CONTROL knob clockwise (↻) while pressing the HOME button. Message "Auto (Push SET button)" will be displayed.

5. To execute the automatic adjustment, press the F5 (SET) button.
   - The displayed message on the video monitor changes to "Auto Adjusting ...". The displayed data value also changes.
6. Confirm the automatic adjustment completion on the video monitor.
   - Message "Auto Adjust Complete" is displayed when the automatic adjustment is completed.

Note

If message "Auto Adjust Failure" is displayed, refer to the "For Automatic Adjustment Failure" below.

7. To exit the sub menu, press the F6 (EXIT) button once.

Note

Go to step 3 in order to perform other VCO free-running frequency adjustment.

8. To exit A23 : CP VR, press the F6 (EXIT) button once.

Saving the Data

Note

Do not save the adjustment data if the automatic adjustment was not completed normally.

9. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
   - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

Note

When loading the previous data without save the current adjusted data, execute "ALL DATA PREVIOUS".

10. Exit the maintenance mode.

For Automatic Adjustment Failure

When the sub menu A231/A232/A233 fail:

The SDI-52 board or VPR-64/91 board is considered to be defective.

When the sub menu A234/A235 fail:

The following board is considered to be defective.

HDW: DIF-134 board (HKDW-102)
MSW: EPR-1 board

8-8-3. VCO Free-running Frequency Manual Adjustment

Notes

- This adjustment is not needed for DVW series.
- Manual adjustment is not needed when the automatic adjustment of Section 8-8-2 can be performed.

Tools

• Oscilloscope:	Tektronix TDS460A or equivalent
• Frequency counter:	Advantest TR5821 or equivalent
• Extension board:	EX-739

- Analog composite video monitor

  Note

  Use this monitor for menu displaying. Be sure to connect it to VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.

Preparation

1. Extend the EPR-1 board (or HPR-1 board) with an extension board EX-739.

Turn off the power, then remove the EPR-1 board or HPR-1 board*.

*: Where the optional board HKDW-102 is equipped.

2. Check the setting of the function menu.

Page4: F4 (CHARA) ⇨ ON

3. Check that the equipment has warmed up.

Before starting the adjustment, warm up the VTR and other equipment through the power for 10 minutes or more.

Manual Adjustment

1. Set the oscilloscope as follows:
   CH-2: DC 2 V/DIV
   TIME: 100 μs/DIV
2. Connect the frequency counter's input to the oscilloscope's CH-2 output.
3. Enter the maintenance mode.
4. Enter A23 : CP VR.
   Maintenance mode → M1 : ADJUST → A2 : AUDIO/VIDEO → A23 : CP VR
5. Enter the following specified sub menu.

HDW Recorder:	A234 and A235
HDW Player:	A234
MSW Recorder:	A234 and A235
MSW Player:	A234

Note

In this time, the adjustment mode is the manual, and "Manual" is displayed on the video monitor.

6. Turn the MULTI CONTROL knob clockwise (↻) to move the *-mark to the line of the adjustment data.

7. Connect the oscilloscope's CH-2 input as follows:

Menu No.		Measurement point
A234	HDW (HKDW-102):	TP-200/DIF-134(A-4) GND : E100/DIF-134(D-4)
	MSW:	TP600/EPR-1(L-2) GND : E600/EPR-1(L-3)
A235	HDW (HKDW-102):	TP-100/DIF-134(C-4) GND : E100/DIF-134(D-4)
	MSW:	TP501/EPR-1(L-3) GND : E600/EPR-1(L-3 or H-1)

8. Change the data until the indicated frequency on the frequency counter satisfies the specification.
   Specification: 27.00 ±0.10 MHz

   Note

   How to change the adjustment data:
   Turn the MULTI CONTROL knob while pressing the HOME button.

9. To exit the sub menu, press the F6 (EXIT) button once.

   Note

   Go to step 5 in order to perform other VCO free-running frequency adjustment.

10. To exit A23 : CP VR, press the F6 (EXIT) button once.

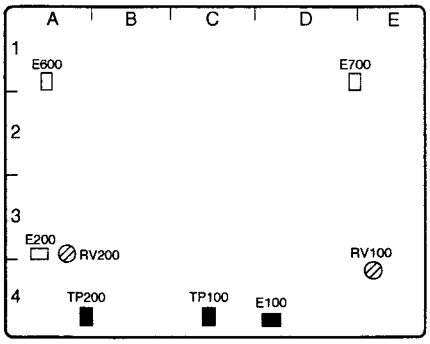
Saving the Data

11. Enter A2F : NV-RAM CONTROL, then execute "SAVE ALL ADJUST DATA".
    - Message "Save Complete" will be displayed on the video monitor when this data save is completed normally.

    Note

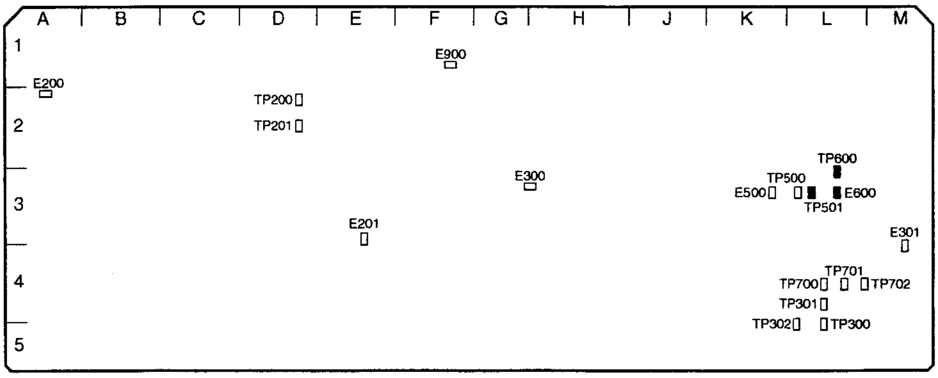
    When loading the previous data without save the current adjusted data, execute "ALL DATA PREVIOUS".

12. Exit the maintenance mode.


A
B
C
D
E
1
2
3
4
E600
E700
E200
RV200
RV100
TP200
TP100
E100

DIF-134 Board (Side A)

Board No. suffix -15


A
B
C
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E
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J
K
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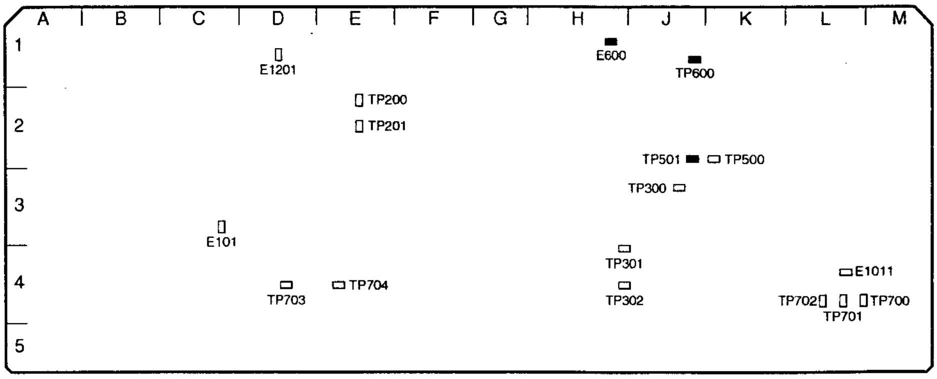
M
1
2
3
4
5
E900
E200
TP200
TP201
E300
TP600
TP500
E500
E600
TP501
E201
E301
TP701
TP700
TP702
TP301
TP302
TP300

Board No. suffix -16 and higher


A
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1
2
3
4
5
E1201
E600
TP600
TP200
TP201
TP501
TP500
TP300
E101
TP301
E1011
TP703
TP704
TP302
TP702
TP700
TP701

EPR-1 Board (Side A)

8-9. Digital Video System Adjustment/ HIF-1 Board

8-9-1. Adjustment Overview

Notes

- Models to be adjusted: HDW series
  DVW series with BKMW-104
  MSW series with BKMW-104
- Adjust when IC800, IC809, or X803, X804 mounted on the HIF-1 board is replaced.

Tools

Frequency counter:	Advantest TR5821
Oscilloscope:	Tektronix TDS460A
Extension board:	EX-739

Adjustments

Item	Adjustment point	Measurement point
INT 74 MHz Frequency		
59.94 Hz mode	RV800/HIF-1	TP702/HIF-1
50 Hz mode	RV801/HIF-1	TP702/HIF-1

Preparation

1. For the HIF-1 board No. suffix -21:

Turn off the power, and extend the HIF-1 board with an extension board EX-739.

2. Check the setup extend menu settings.

ITEM-337 : EXTERNAL REFERENCE SELECT ⇨ HD

Note

The following switch setting of the SS-89 board allows to display the setup extended menu.

S1502 (B-1) : Bit-1 ⇨ ON

3. Check the equipment has warmed up.

Before starting the adjustment, warm up the VTR and other equipment through the power for 10 minutes or more.

8-9-2. INT 74 MHz Frequency Adjustment

Note

For HDW/MSW series:

Perform this adjustment in both the 59.94 Hz mode and the 50 Hz mode. Change the setting of the setup menu ITEM-013 to switch the mode.

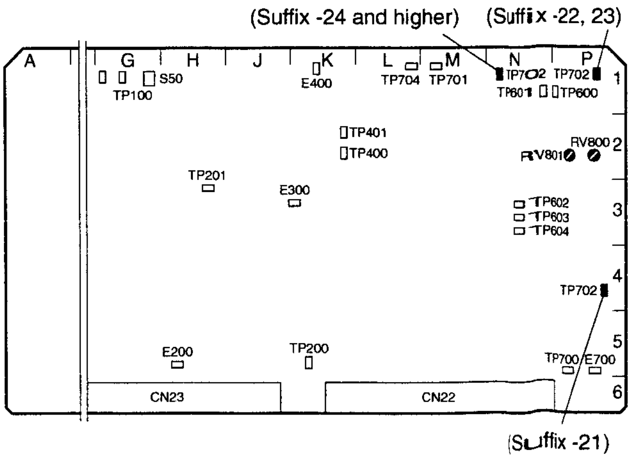
59.94 Hz Mode Adjustment

1. Connectors on the connector panel; REF IN, all VIDEO INs and etc must be unused; nothing to be connected.
2. Connect the CH2 input of the oscilloscope to TP702/HIF-1(P-1/P-4*).
   Connect input of the frequency counter to oscilloscope CH2 output.
   *: Board No. suffix -21
3. Check the value of the frequency counter, then perform adjustment.
   Adjusting point: ⊘RV800/HIF-1(P-2)
   Specification: 74.1758 ±0.0001 MHz
4. Switch the operation mode to 50 Hz with the setup menu ITEM-013.

---

50 Hz Mode Adjustment

1. Put the unit into the same state as steps 1 and 2 of the above mentioned "59.94 Hz Mode Adjustment".
2. Check the value of the frequency counter, then perform adjustment.
   Adjusting point: ⊘RV801/HIF-1(P-2)
   Specification: 74.2500 ±0.0001 MHz
3. Reset the operation mode to the original one with the setup menu ITEM-013.
4. Reset the setup extend menu to the customer settings.



HIF-1 Board (Side A)

8-10. LTC System Alignment and Full Erasure Current Check (TC-104 Board)

8-10-1. Adjustment Overview

When the TC-104 board is repaired or replaced, perform the time code system alignment.

Note

For HDW/MSW series:

Check that the unit sets into the following mode. If it does not, change the setting of the setup menu ITEM-013. (Refer to the operation manual.)

NTSC model:	59.94 Hz or 525 mode
PAL model:	50 Hz or 625 mode

Tools

To perform the time code system alignment for the VTR, prepare the following equipment (or equivalent) and fixtures.

Note

Before starting the adjustment, warm up the VTR and equipment to be used through the power for 10 minutes or more.

Oscilloscope	Tektronix TDS460A	
Audio level meter	Hewlett-Packard HP3400A	
Alignment tape	HR5-1A (Part No. 8-960-076-01)	For HDW series
	ZR5-1 (Part No. 8-960-073-01)	For DVW series NTSC model
	ZR5-1P (Part No. 8-960-073-51)	For DVW series PAL model
	MR5-1 (Part No. 8-960-077-01)	For MSW series NTSC model
	MR5-1P (Part No. 8-960-077-51)	For MSW series PAL model
Analog composite video monitor (For player only) **Note** Use this monitor for menu displaying. Connect to the VIDEO OUTPUT COMPOSITE 3 (SUPER) connector.		
Recording tape	Sony BCT-HD series (HDCAM cassette)	For HDW series
	Sony BCT-D series (Digital Betacam cassette)	For DVW series
	Sony BCT-MX series (MPEG IMX cassette)	For MSW series

Notes

- Use the virgin tape or no recorded tape that erased using the tape eraser, etc. in advance for the tape to be used during recorder adjustments.
- Use a tape recorded with normal time codes on a different VTR with the same format for the recorded tape to be used during player adjustments.

Adjustments

Section	Item (Section title)	Adjustment point	Measurement point
8-10-2	LTC playback level check	—	TP102/TC-104(A-4)
8-10-3	LTC recording level check	—	TP100/TC-104(A-1)
8-10-4	Full erasure current check (Recorder only)	—	TP301/TC-104(A-3)
8-10-5	LTC erasure current adjustment	⊘LV200/TC-104 (A-2)	TP201/TC-104(A-2)

Common Preparation

Perform the settings of control panels' switch and function menu, before starting the adjustments.

Notes

- Reset all the settings to the customer settings after completing the alignment.
- [R]: for recorder only

Location	Item		Customer setting		Setting at adjustment	Remarks
Switch panel	KEY INHIBIT switch		______	⇨	OFF	
Upper control panel	REMOTE:	1 (9P)	______	⇨	OFF (Light off)	
		2 (50P)	______	⇨	OFF (Light off)	
Function menu	Page1	[R] F1 (TCG)	______	⇨	INT	
		[R] F2 (TCG)	______	⇨	REGEN	
		[R] F3 (RUN)	______	⇨	REC	
		F6 (TCR)	______	⇨	LTC	
	Page4	[R] F5 (REC INH)	______	⇨	OFF	

8-10-2. LTC Playback Level Check

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Alignment tape:
  - For HDW series: HR5-1A
  - For DVW series:
    - NTSC model: ZR5-1
    - PAL model: ZR5-1P
  - For MSW series
    - NTSC model: MR5-1
    - PAL model: MR5-1P

Preparation

1. Check the settings for adjustment.

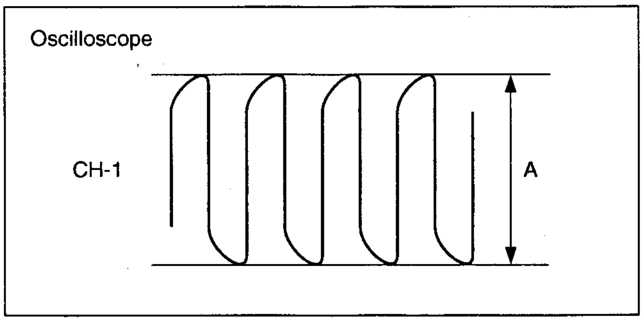
Refer to Section 8-10-1.

2. Check that the equipment has warmed up.

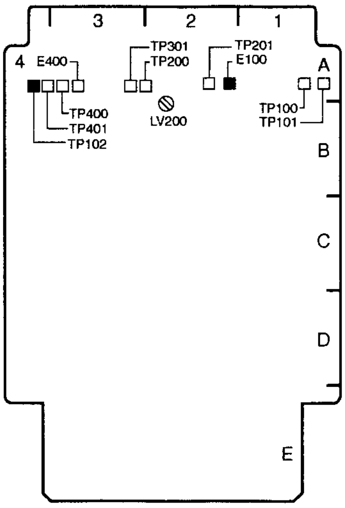
Before starting the adjustment, warm up the VTR and oscilloscope through the power for 10 minutes or more.

Playback Level Check

1. Set and connect the oscilloscope as follows:
   CH-1: TP102/TC-104(A-4), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 µs/DIV
2. Insert the alignment tape.
3. During play back the alignment tape in the following PB modes, check each level on the oscilloscope.
   PB modes: PLAY
   REW
   SHUTTLE (−5 times speed)
   SHUTTLE (−0.21 time speed)
   Specification: A ≧ 1.5 V p-p (in each PB mode)



4. Eject the alignment tape.



TC-104 Board (Side A)

8-10-3. LTC Recording Level Check

Tools

- Oscilloscope: Tektronix TDS460A or equivalent
- Analog composite monitor (For player only)

  Note

  This monitor is for menu displaying. Connect to the VIDEO OUTPUT COMPOSITE 3(SUPER) connector.
- Recording tape

HDW series:	BCT-HD series
DVW series:	BCT-D series
MSW series:	BCT-MX series

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-10-1.)
- Warming up of equipment to be used (10 minutes or more).

Recording Level Check (for Recorder)

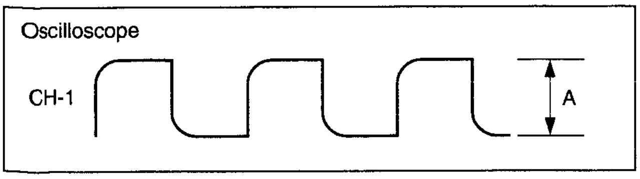
Note

Models to be adjusted:
HDW-2000, M2000/P, S2000/P
DVW-2000/P, M2000/P
MSW-2000, A2000/P, M2000/P

1. Set and connect the oscilloscope as follows:
   CH-1: TP100/TC-104(A-1), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 μs/DIV
2. Insert the recording tape.

   Note

   For this recording tape, use a blank tape erased using the tape eraser, etc. in advance.
3. Check the level on the oscilloscope in recording on the tape.
   Specification: A = 50 ±5 mV p-p



4. Eject the recording tape.

Recording Level Check (for Player)

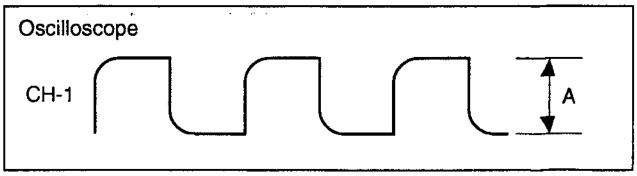
Note

Models to be adjusted: HDW-M2100/P
MSW-M2100/P

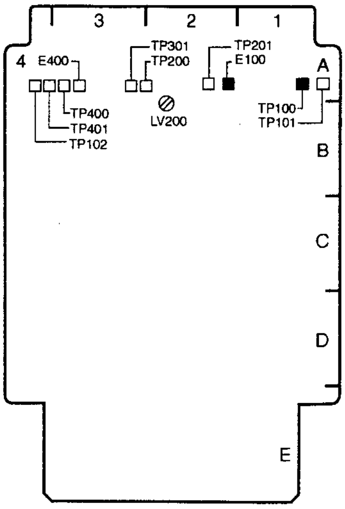
1. Set and connect the oscilloscope as follows:
   CH-1: TP100/TC-104(A-1), DC 100 mV/DIV
   GND: E100/TC-104(A-2)
   TIME: 100 μs/DIV
2. Insert the recording tape.

   Note

   Use the tape with the time code recorded by a VTR of the same format.
3. Enter the maintenance mode.
4. Select A6 : LTC REC
   Maintenance mode → M1 : ADJUST → A6 : LTC REC
5. Press F5 (SET) button once when message "PUSH SET" is displayed in the video monitor screen.
   - It starts recording. Then, the REC/ERASE indicator lights on of GOOD SHOT.
6. Check the waveform level on the oscilloscope.
   Specification: A = 50 ±5 mV p-p



7. Exit the maintenance mode.
8. Eject the recording tape.



TC-104 Board (Side A)

8-10-4. Full Erasure Current Check (for Recorder Only)

Note

Models to be adjusted:

HDW-2000, D2000, M2000/P, S2000/P
DVW-2000/P, M2000/P
MSW-2000, A2000/P, M2000/P,
M2000E/P

Tools

- Audio level meter:
  Hewlett-Packard HP3400A or equivalent
- Recording tape

HDW series:	BCT-HD series
DVW series:	BCT-D series
MSW series:	BCT-MX series

Note

For this recording tape, use a blank tape erased using the tape eraser, etc. in advence.

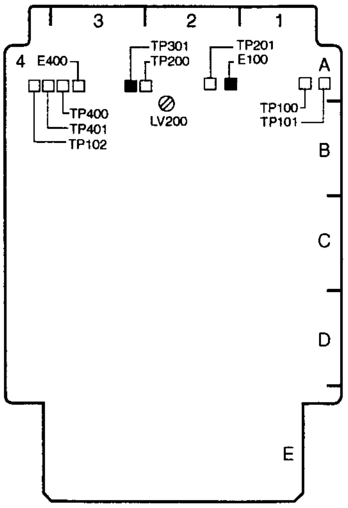
Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-10-1.)
- Warming up of equipment to be used (10 minutes or more).

Full Erase Current Check

1. Connect the audio level meter (V rms measurement mode) to TP301(A-3) on the TC-104 board.
   GND: E100/TC-104(A-2)
2. Insert the recording tape.
3. Check the level on the audio level meter in recording on the tape.
   Specification: 120 mV rms or more
   (Note: 40.5 ± 1.0 kHz)



TC-104 Board (Side A)

8-10-5. LTC Erasure Current Check

Tools

- Audio level meter:
  Hewlett-Packard HP3400A or equivalent
- Analog composite monitor (For player only)
- Recording tape

HDW series:	BCT-HD series
DVW series:	BCT-D series
MSW series:	BCT-MX series

Preparation

1. Conditions to be kept are:

- Settings for adjustment. (Refer to Section 8-10-1.)
- Warming up of equipment to be used (10 minutes or more).

LTC Erase Current Check (for Recorder)

Note

Models to be adjusted:
HDW-2000, D2000, M2000/P, S2000/P
DVW-2000/P, M2000/P
MSW-2000, A2000/P, M2000/P,
M2000E/P

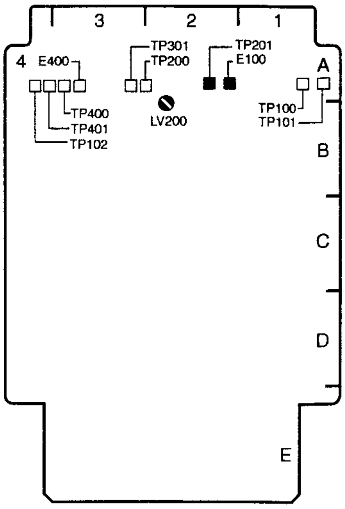
1. Connect the audio level meter (V rms measurement mode) to TP201(A-2) on the TC-104 board.
   GND: E100/TC-104(A-2)
2. Insert the recording tape.
   Note
   For this recording tape, prepare a blank tape erased using the tape eraser, etc. in advence.
3. Check the level on the audio level meter in recording on the tape.
   Adj. point: ⊘LV200/TC-104(A-2)
   Specification: 120 mV rms
   (Note: 48.0 ± 1.0 kHz)
4. Eject the recording tape.

LTC Erase Current Check (for Player)

Note

Models to be adjusted: HDW-M2100/P
MSW-M2100/P, M2100E/P

1. Connect the audio level meter (V rms measurement mode) to TP201(A-2) on the TC-104 board.
   GND: E100/TC-104(A-2)
2. Insert the recording tape.
   Note
   Use the tape with the time code recorded by a VTR of the same format.
3. Enter the maintenance mode.
4. Select A6 : LTC REC
   Maintenance mode → M1 : ADJUST → A6 : LTC REC
5. Press F5 (SET) button once when message "PUSH SET" is displayed in the video monitor screen.
   - It starts recording. Then, the REC/ERASE indicator lights on of GOOD SHOT.
6. Check the level on the audio level meter.
   Specification: 120 mV rms (Note: 48.0 ± 1.0 kHz)
7. Exit the maintenance mode.
8. Eject the recording tape.



TC-104 Board (Side A)

8-11. Tele-File System Adjustment (DIO-65 Board)

Notes

- Perform this adjustment when the DIO-65 or SE-606 board of the Tele-File-capable unit has been replaced.
- For detail of each menu in the maintenance mode, refer to Section 3.

Tools

- Oscilloscope: Tektronix TDS460A or equivalent

  Note

  Use a probe with input capacity of approx. 10.8 pF (TEK P6137 or equivalent).
- Adjustment driver (ceramic)

Adjustment

Note

Pay careful attention to the following points to perform the correct adjustment.

- Be sure to remove the cassette tape from the unit.
- Keep the SE-606 board away from the piece of metal such as chassis and so on.

1. Set and connect the oscilloscope as follows:

   Note

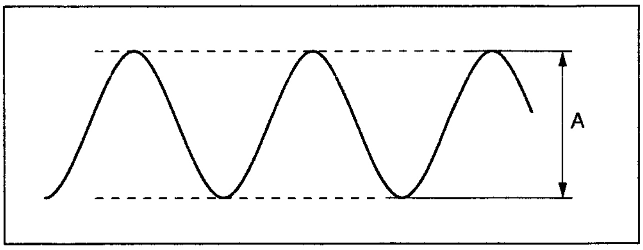
   Never contact the ground probes with the DIO-65 board. This may cause damage to the DIO-65 board.

   CH-1: TP101/DIO-65(A-1), AC 5 V/DIV
   GND: Chassis
   CH-2: TP102/DIO-65(A-1), AC 5 V/DIV
   GND: Chassis
   MODE: CH2 INVERT, ADD,
   20 MHz BW LIMIT = OFF
   TIME: 20 nsec/DIV
   TRIG: CH-1, AC
   LEVEL: 1 V

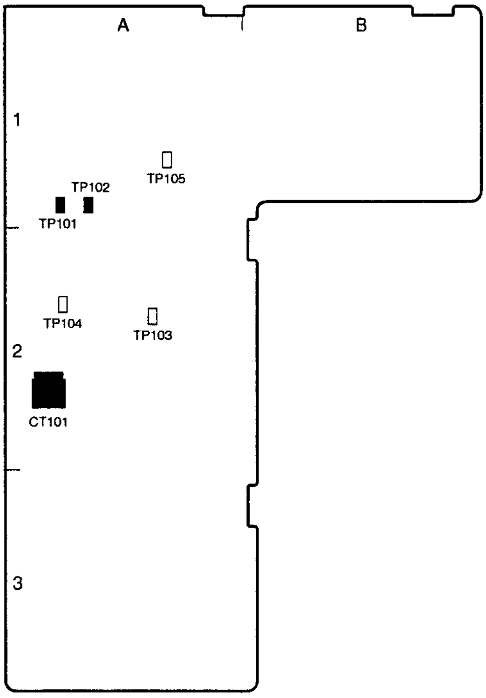
2. Enter the maintenance mode.
3. Select A8 : TELE-FILE I/F

   Maintenance mode → M1 : ADJUST → A8 : TELE-FILE I/F
4. Rotate the MULTI CONTROL knob while pressing the HOME button to change from "OFF" to "ON", and then press the F5 (SET) button.
5. While checking the 13.5 MHz waveform with the oscilloscope, adjust using the adjusting driver (ceramic) to maximize the amplitude.

   Adj. point: ⊘CT101/DIO-65(A-2)
   Specification: A = maximum value (more than 14 V p-p of sine waveform)



6. Check that the Tele-File data can be read, written, and that the unit operates normally.
   (Refer to the operation manual.)
7. Exit the maintenance mode.



DIO-65 Board (Side A)

Section 9

Video Head Tip Protrusion Measurement

This section provides the procedure to measure the tip protrusion of video heads using a head tip protrusion measurement gauge when performing the periodic maintenance, inspection etc.

Note

Be careful not to damage heads when using the gauge.

If the tip protrusion of all heads are satisfying the following specification and more, it enables to recording and playing back on the tape.

HDW series

Head	Specification
REC heads for HDCAM format	24 µm
Advance PB heads for HDCAM format	22 µm
Confidence PB heads for HDCAM format	24 µm
PB heads for Betacam SX format	22 µm
PB heads for Betacam/Betacam SP format	20 µm

DVW series

Head	Specification
REC heads for Digital Betacam format	24 µm
Advance PB heads for Digital Betacam format	22 µm
Confidence PB heads for Digital Betacam format	24 µm
PB heads for Betacam SX format	22 µm
PB heads for Betacam/Betacam SP format	20 µm

MSW series

Head	Specification
REC heads for MPEG IMX format	24 µm
Advance PB heads for MPEG IMX format	22 µm
Confidence PB heads for MPEG IMX format	24 µm
PB heads for Betacam SX format	22 µm
PB heads for Betacam/Betacam SP format	20 µm

If the tip protrusion of any one head is under the specification, it is recommended that the upper drum assembly should be replaced early before occurring the trouble at the recording or playing back.

For the upper drum replacement, refer to Section 5-2.

Tools

• Cleaning cloth:	3-184-527-01
• Cleaning fluid:	9-919-537-01
• Head tip protrusion measurement gauge:	J-6530-650-A
• Torque screwdriver (6 kgf•cm) (JB-5251):	J-6252-510-A
• Torque screwdriver's bit (+2 mm, l = 75 mm):	J-6323-420-A

Preparation for VTR

1. Remove the upper lid (front) assembly.
   (Refer to Section 1-3-1.)
2. Remove the cassette compartment.
   (Refer to Section 1-5.)
3. Remove the brush slip ring assembly.
   (Refer to Section 5-4.)
4. Clean the outer circumference and video heads of the upper drum (shaded portions in Figure 1).
   (Refer to Section 4-2-3 for the cleaning method.)

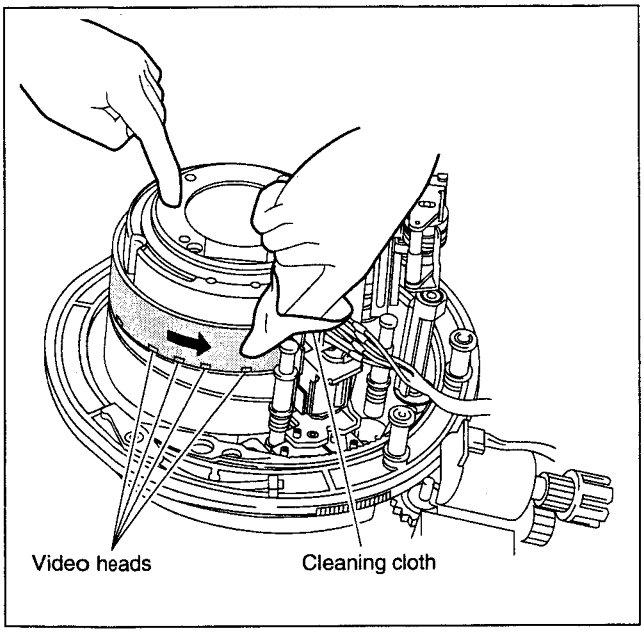


Figure 1. Cleaning of Drum

Preparations for Head Tip Protrusion Measurement Gauge

This gauge is the precision equipment. Handle with care.

1. Loosen the adjustment screw fully (by turning it counterclockwise).
2. Clean the probe, positioning flange, and portion touching the drum of two legs. (Refer to Figure 3.)

   Note

   Do not apply excessive force to the probe during cleaning. If a deposit of μm order exists, measurement cannot be performed accurately.

Setting of Head Tip Protrusion Measurement Gauge

Note

Being careful not to damage the tape-running surface and video heads of the drum, set the gauge.

1. Turn the upper drum manually counterclockwise (↺) to align the screw hole (⇨ mark on the board cover) to the rib of the threading ring as shown in Figure 2.

   Note

   The upper drum position is determined as described above to put the probe of the head tip protrusion measurement gauge on the absence of a head. The video head that first measures the protrusion value is the ADV A head.
2. Check the value that the dial gauge pointer reads.
3. Put a probe for positioning as follows:
   - Recorder: A probe between the REC B head and ADV A head.
   - Player: A probe between C-A head and ADV A head.

   (Refer to Figure 2.)
4. Press the tip of two legs against the outer circumference of the drum's upper surface while keeping the base plate of the measurement gauge in parallel with the upper surface of the drum. Be sure to keep the probe of the measurement gauge sufficiently away from the drum.
5. Lower the measurement gauge slowly until the ridges of the two legs and positioning flange touch the upper drum while pushing two legs against the outer circumference of the drum's upper surface (applying force slightly to the measurement gauge in the direction indicated by the arrow). (Refer to Figure 3.)

   Notes

   - Before placing a measurement gauge on the drum, ensure that the adjustment screw has been loosened fully.
   - Perform carefully and slowly so that the probe of a measurement gauge does not touch the outer circumference or video head on the drum. (Lower so that the probe is slightly higher than the two legs.)
   - After placing the measurement gauge on the drum, be sure to support it with hand at all time.
     If it is loose carelessly, the drum and measurement gauge will turn and damage the peripheral parts.
6. Check to see the followings:
   - The probe is in the middle of the adjacent heads.
   - The positioning flange adheres closely to the outer circumference of the drum's upper surface.
   - The legs adhere closely to the outer circumference of the drum's upper surface.
   - The value that the dial gauge pointer reads is the same as before setting (in step 2).

7. Turn the adjustment screw clockwise until the dial gauge pointer rotates approximately a half turn.
8. Turn the outer frame of the dial gauge to align zero (0) to the pointer.

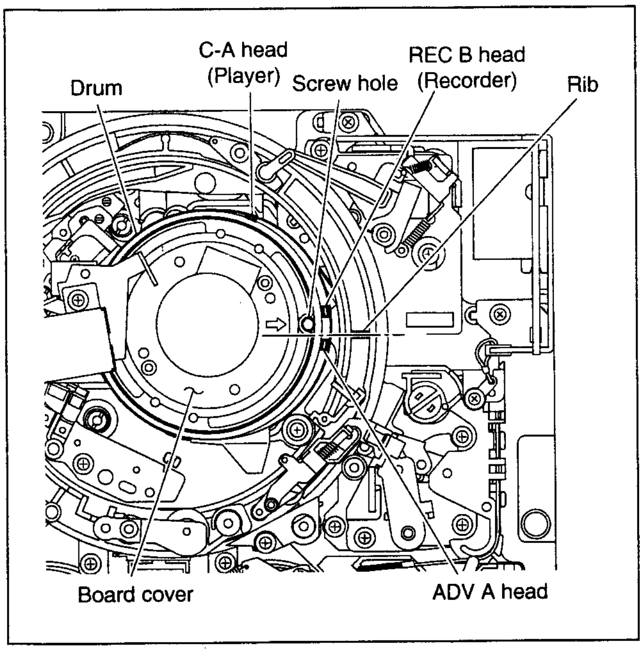

Drum
C-A head
(Player)
Screw hole
REC B head
(Recorder)
Rib
Board cover
ADV A head

Figure 2. Setting of Drum Position

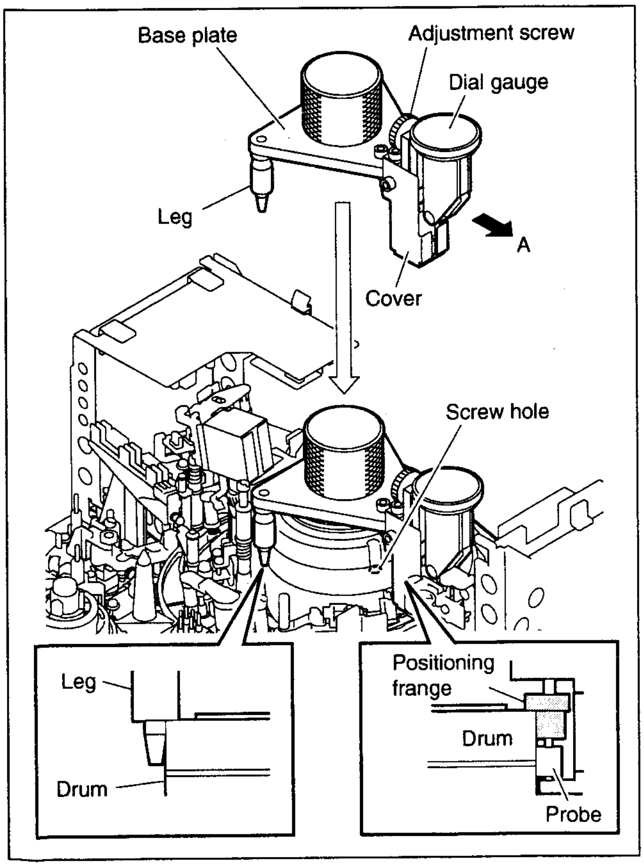

Base plate
Adjustment screw
Dial gauge
Leg
A
Cover
Screw hole
Leg
Drum
Positioning
frange
Drum
Probe

Figure 3. Setting of Head Tip Protrusion Measurement Gauge

Measurement of Head Tip Protrusion

Note

When turning the upper drum manually, hold the cover of the measurement gauge by your hand to not come to turn the gauge with the drum rotation.

1. Turn the upper drum manually counterclockwise (↺) very slowly to approach a video head aside of the probe. (Refer to <A> in Figure 4.)
2. Read the dial gauge pointer. (= Ha)

   Note

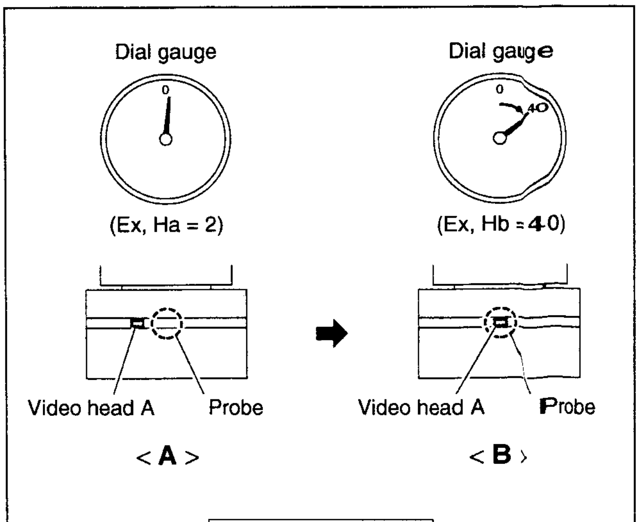
   The scale of the dial gauge is 2 μm (0.002 mm) pitch. Clockwise: +. Counterclockwise: −.

3. Turn the upper drum manually counterclockwise (↺) very slowly to center the video head in the probe. (Refer to <B> in Figure 4.)
4. Read the dial gauge pointer. (= Hb)
5. Calculate the real head tip protrusion Hr with the Ha and Hb.

   Hr = Hb − Ha
6. Calculate the head tip protrusion Hr for all heads with steps 1 through 5 performing .
7. Measure and calculate the real head tip protrusion Hr for all heads again.

   Note

   Do it two times for fear of measuring error.


Dial gauge
0
(Ex, Ha = 2)
Video head A
Probe
< A >
Dial gauge
0
40
(Ex, Hb = 40)
Video head A
Probe
< B >

Hr = Hb − Ha
= 40 − 2
= 38 (μm)

Figure 4. Example of Head Tip Protrusion Measurement

This table is in measure order of the heads.

			HDW-2000 HDW-D2000	HDW-M2000/P HDW-S2000/P		HDW-M2100/P
			DVW-2000/P	DVW-M2000/P		
Head name	**Measurement 1st time**	**Measurement 2nd time**		**MSW-A2000/P** **MSW-M2000/P** **MSW-M2000E/P**	**MSW-2000**	**MSW-M2100/P** **MSW-M2100E/P**
	(µm) **Hb − Ha = Hr**	**(µm)** **Hb − Ha = Hr**	**Spec. (µm)** **Hr**	**Spec. (µm)** **Hr**	**Spec. (µm)** **Hr**	**Spec. (µm)** **Hr**
ADV A	− =	− =	22	22	22	22
ADV B	− =	− =	22	22	22	22
SX A1	− =	− =	no head	22	22	22
SX B1	− =	− =	no head	22	22	22
CNF A	− =	− =	24	24	24	24
CNF B	− =	− =	24	24	24	24
Y-B	− =	− =	no head	20	no head	20
C-B	− =	− =	no head	20	no head	20
Erase CD	− =	− =	20	20	20	no head
REC C	− =	− =	24	24	24	no head
REC D	− =	− =	24	24	24	no head
Dummy	(no need fo measurement)		−	−	−	−
ADV C	− =	− =	22	22	22	22
ADV D	− =	− =	22	22	22	22
SX A5	− =	− =	no head	22	22	22
SX B5	− =	− =	no head	22	22	22
CNF C	− =	− =	24	24	24	24
CNF D	− =	− =	24	24	24	24
Y-A	− =	− =	no head	20	no head	20
C-A	− =	− =	no head	20	no head	20
Erase AB	− =	− =	20	20	20	no head
REC A	− =	− =	24	24	24	no head
REC B	− =	− =	24	24	24	no head

Removal of Head Tip Protrusion Measurement Gauge

1. Turn the upper drum manually counterclockwise (↺) very slowly to move a video head aside from the probe.
2. Loosen the adjustment screw fully (by turning it counterclockwise).
3. Lift up the positioning flange from the outer circumference of the drum's upper surface to a few millimeters, and then lift the measurement gauge slowly and remove it while pushing two legs against the outer circumference of the drum's upper surface (applying force slightly to the measurement gauge in the direction indicated by arrow A). (Refer to Figure 5.)

   Note

   Perform carefully and slowly so that the probe of a measurement gauge does not touch the outer circumference or video head on the drum.

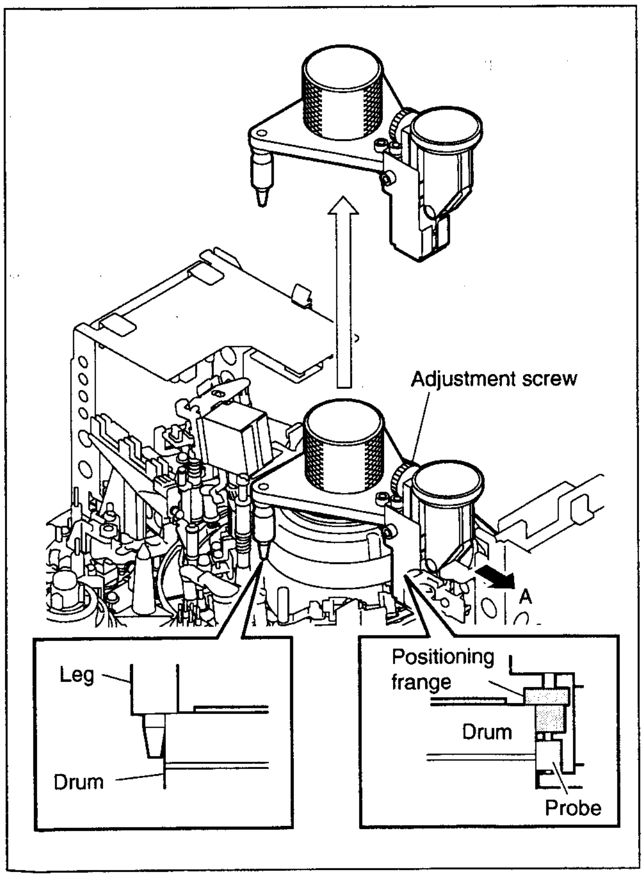


Figure 5. Removal of Head Tip Protrusion Measurement Gauge

Section 10
MPEG IMX Format Outline

10-1. Format Outline

MPEG IMX is the format to realize recording MPEG2 compression 50 Mbps high picture quality video signal and audio signal of maximum 8 channels as long as 3 hours (525 system).
Alike traditional Betacam series, 1/2" tape in width is applied in this format.
As for compression of video signal, MPEG2 (422P@ML, I frame, 50 Mbps) format is adopted. This compression format is adopted to a server and non-linear editor, too, which are based on the same MPEG2 format.
Connecting the MPEG IMX model to these units through the SDTI-CP interface, less deterioration dubbing is achieved.
Although audio signal is non-compression format recording, it has two audio track modes, one to record 8 channels and other to 4 channels depending upon either accuracy of 16 bit, or 24 bit, respectively.

10-2. Recording Format

Tape pattern

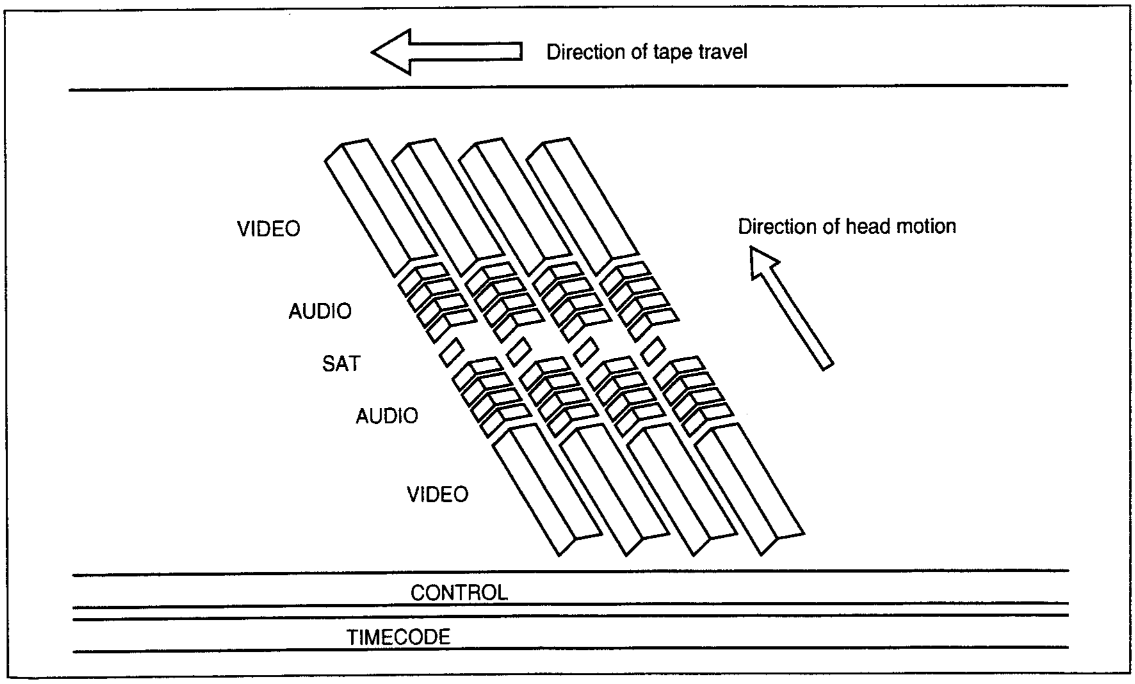
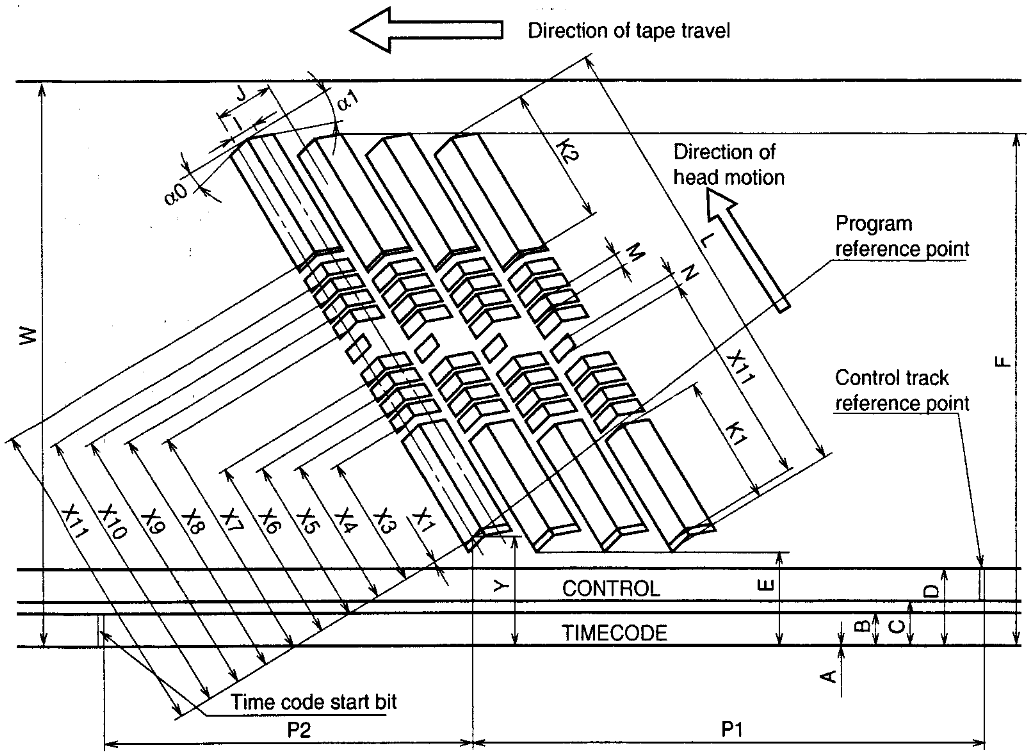


Fig. 10-2-1. MPEG IMX Format Tape Pattern

MPEG IMX profiles the tape pattern, recording 1 frame of video signal and its corresponding audio signal using 8 tracks. 8 audio sectors are prepared per 1 track, and 8 ch or 4 ch audio signal is recorded. (When the case is 4 ch, 2 sectors are allocated for 1 channel.)
In the central part of a track (+azimuth only), a pilot signal for SAT (Supplemental Automatic Tracking) is recorded in order to render high precision tracking that is required when insert-editing is performed.
A track pitch is 21.7 μm which is same to the Digital Betacam 525 format, but due to the tape speed of about 2/3 compared with the above format, a recording time can be elongated.
In the bottom part and longitudinal direction of tape, CONTROL and TIME CODE tracks are arranged as same as Betacam, Betacam SP, Betacam-SX, and Digital Betacam formats.
Refer details to Fig. 10-2-2.


Direction of tape travel
J
I
α1
α0
K2
Direction of head motion
Program reference point
L
M
N
X11
K1
Control track reference point
W
F
X11
X10
X9
X8
X7
X6
X5
X4
X3
X1
Y
CONTROL
E
D
TIMECODE
B
C
A
Time code start bit
P2
P1

Dimensions		Dimensions in mm 525/60	625/50
A	Time code track lower edge	0	0
B	Time code track upper edge	0.4	0.4
C	Control track lower edge	0.7	0.7
D	Control track upper edge	1.1	1.1
E	Program area lower edge	2.327	1.597
F	Program area upper edge	11.465	11.465
I	Helical track pitch (+/− azimuth)	0.02	0.02
J	Helical track pitch (+/+ azimuth)	0.0434	0.0434
K1	Video sector 1 length	44.11	47.032
K2	Video sector 2 length	44.11	47.032
L	Helical track total length	113.04	122.092
M	Audio sector length	2.573	2.973
N	Tracking data area length	1.002	1.002
P1	Control track reference to program reference	56.249	47.228
P2	TC start bit to program reference	169.775	178.792
X1	Location of start of video sector 0	0	0
X2	Location of start of video sector 1	68.931	75.06
X3	Location of start of audio sector 0	44.635	47.558
X4	Location of start of audio sector 1	47.422	50.745
X5	Location of start of audio sector 2	50.208	53.932
X6	Location of start of audio sector 3	52.994	57.119
X7	Location of start of audio sector 4	57.585	62.111
X8	Location of start of audio sector 5	60.371	65.298
X9	Location of start of audio sector 6	63.158	68.485
X10	Location of start of audio sector 7	65.944	71.673
X11	Location of start of tracking data	56.182	60.708
Y	Program area reference	2.359	1.629
W	Tape width	12.65	12.65

Dimensions		Angles (°) 525/60	625/50
θ	Track angle	4.62644	4.62644
α0	Azimuth angle	−15.269	−15.269
α1	Azimuth angle	15.231	15.231

Fig. 10-2-2. Detail of MPEG IMX Format Tape Pattern

Comparison of the format parameters

The following Fig. 10-2-3 presents the parameters comparing MPEG IMX format with other digital formats.

	Digital Betacam 525 / 625	**Betacam-SX 525 / 625**	**MPEG IMX 525 / 625**
VIDEO Compression	Field DCT	MPEG2 4:2:2Profile@ML	MPEG2 4:2:2Profile@ML
GOP	Field	2 Frame (I,B)	Frame (I)
ECC inner	178,164	124,112	162,150
outer	106,96 126,114	64,50	60,46 64,54
AUDIO ch	4ch	4ch	8/4ch
Sampling/Quantization	48 kHz / 20 bit	48 kHz / 16 bit	48 kHz / 16 bit/24 bit
ECC inner	178,164	124,112	117,105 137,125
outer	10,5 18, 9	14,6	18,8
Tracks/GOP	6 / field	10 / 2fr 12 / 2fr	8 / frame
Tape speed (mm/s)	96.7	59.515 59.575	64.467 53.776
Track pitch (μm)	21.7 26	32	21.7
Min. wavelength (μm)	0.69 0.587	0.744	0.557
TOTAL Rate (Mbps)	127.8 125.6	43.9	97.3 87.7
VIDEO NET (Mbps)	89.5 88.7	18.7	50
Recording time (min.) L	124	194	184 220
S	40	64	60 71
Tape	BCT-D	BCT-SX/SXA	BCT-MX
Record angle (deg)	4.62644 4.63032	4.62134	4.62644
Track total length (mm)	122.941 122.838	108.663 108.772	113.04 122.09

Studio recorder			
Standard drum dia. (mm)	81.4	81.4	81.4
Drum frequency (Hz)	90/1.001 75	75/1.001 75	60/1.001 50
Number of REC head	4ch	2ch	4ch
Camcorder			
Drum frequency (Hz)	45 37.5	37.5	30 25
Number of REC head	8ch	4ch	8ch

Fig. 10-2-3. Comparison of the Format

Data array in a track

The following Fig. 10-2-4 shows data array of 1 frame which to be recorded onto 8 tracks.

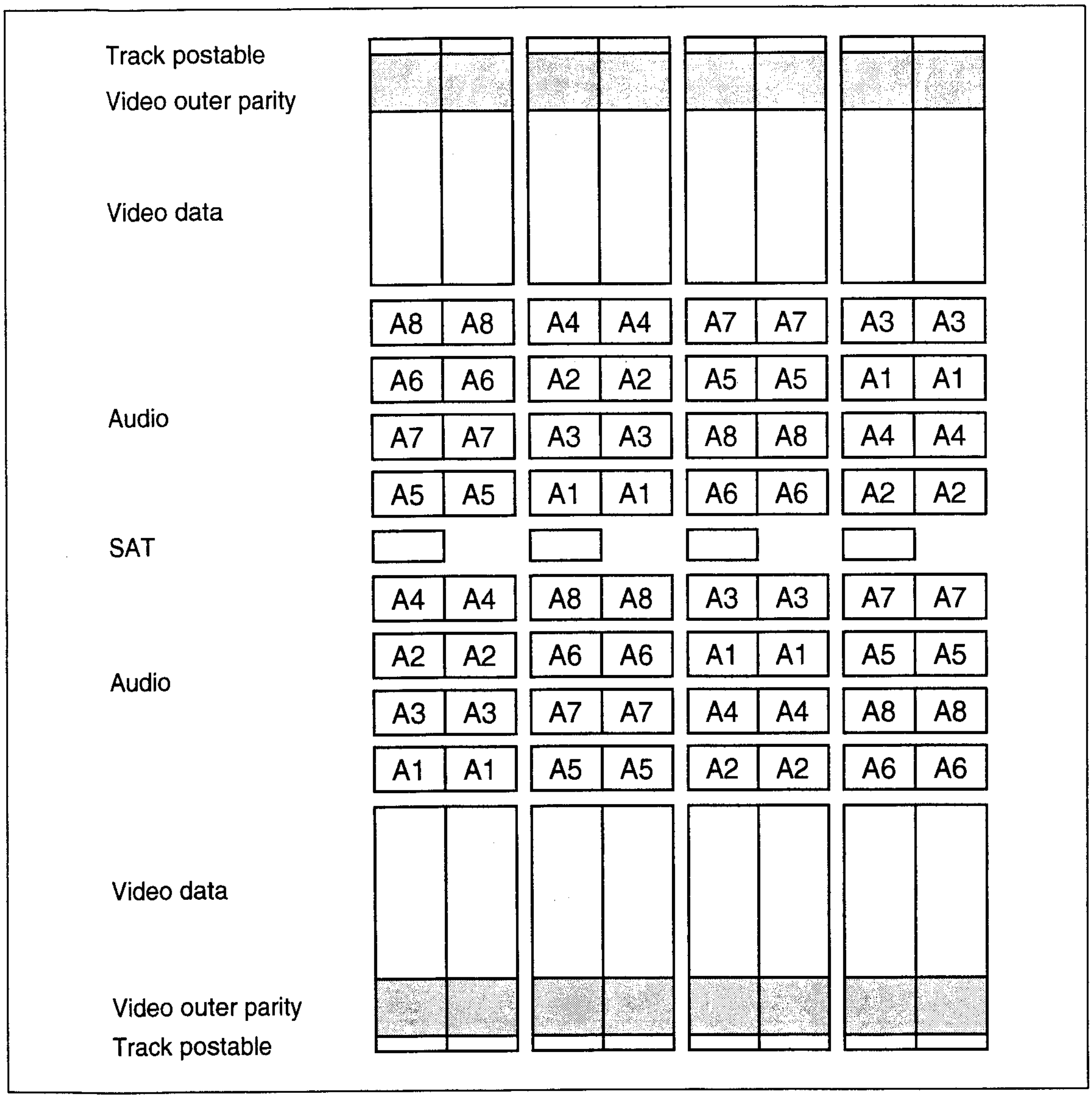

Track postable
Video outer parity
Video data
Audio
A8 A8 A4 A4 A7 A7 A3 A3
A6 A6 A2 A2 A5 A5 A1 A1
A7 A7 A3 A3 A8 A8 A4 A4
A5 A5 A1 A1 A6 A6 A2 A2
SAT
Audio
A4 A4 A8 A8 A3 A3 A7 A7
A2 A2 A6 A6 A1 A1 A5 A5
A3 A3 A7 A7 A4 A4 A8 A8
A1 A1 A5 A5 A2 A2 A6 A6
Video data
Video outer parity
Track postable

Fig. 10-2-4. Recording Data Array

Each track is configured with 8 audio sectors on its central part while both sides of which are of video data. Meanwhile, data of each audio channel are recorded on two adjoining tracks by every turn of two tracks with a change of sector. This purposes to protect data from errors caused by any possible flaws in the longitudinal direction of tape. Compressed video data, that is, proportional amount as to 1 frame, are equally allocated into total 16 sectors of the upper and lower part of each track, and recorded. Error correction data of video data (Video outer parity) are located on both edges of the tape aiming at full protection of effective data even if any damages may happen to occur in a part of edge of tape. In addition, edit gaps are implemented between each sector of audio and video in order to perform independent insert editing.

When the audio recording mode is 24 bit 4 ch, two audio sectors properly cover for 1 ch as shown below:

Ch1 : A1 + A5
Ch2 : A2 + A6
Ch3 : A3 + A7
Ch4 : A4 + A8

Control track

Fig. 10-2-5 shows the relation between the control track signal (CTL) of MPEG IMX format and the reference signal (SVREF) of video signal, used for a servo system. As for the control signal, it adopts the same format as Digital Betacam and Betacam SX.

Color framing of a composite video signal of 525/625 system is recorded in a manner of duty ratio of rectangular wave signal. 5-field sequence signal in the 525 system, which shows reference clock of audio signal (48 kHz) relative to video signal, is also recorded as a duty ratio of rectangular wave signal.

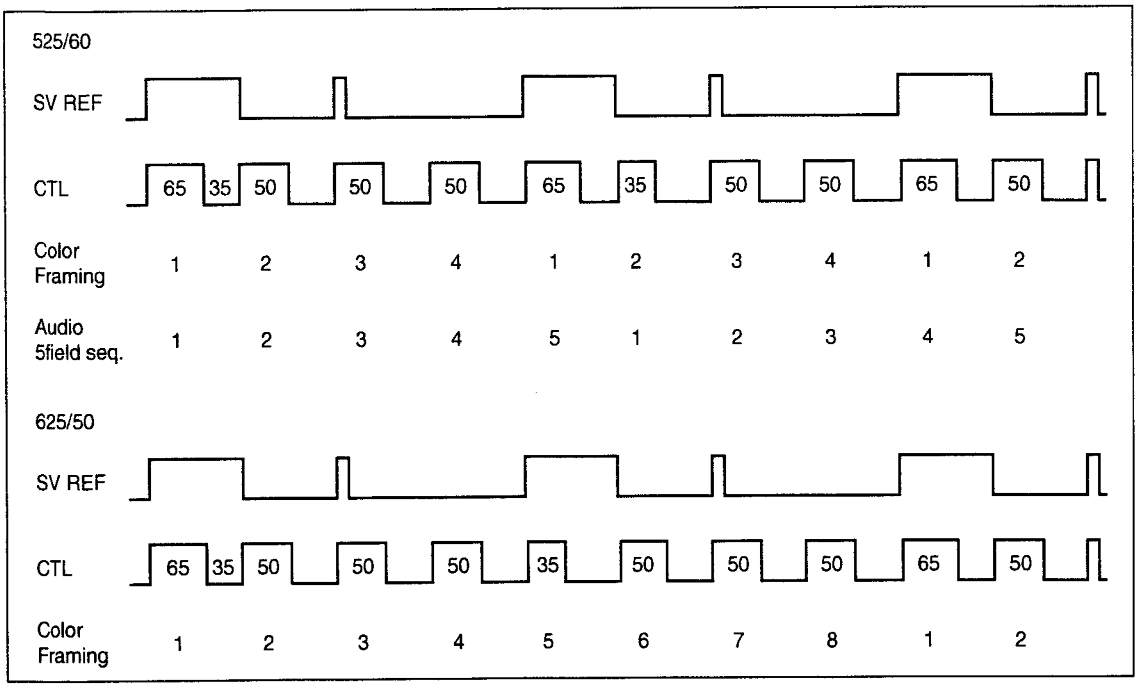
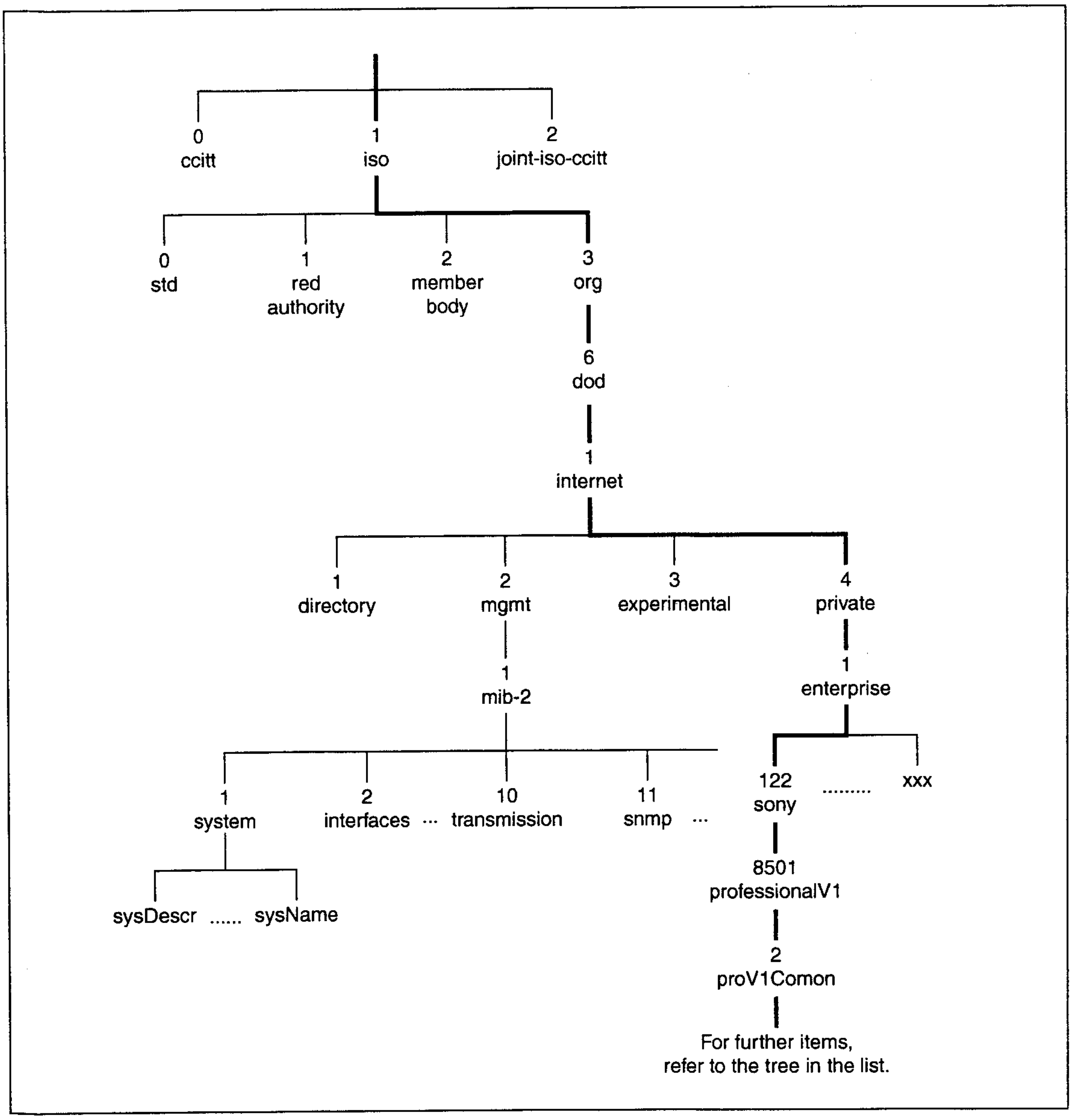

525/60
SV REF
CTL
65 35 50 50 50 65 35 50 50 65 50
Color Framing
1 2 3 4 1 2 3 4 1 2
Audio 5field seq.
1 2 3 4 5 1 2 3 4 5
625/50
SV REF
CTL
65 35 50 50 50 35 50 50 50 65 50
Color Framing
1 2 3 4 5 6 7 8 1 2

Fig. 10-2-5. Timing Chart of CTL Signal and Time Code Signal Recording

Time code signal also is recorded on a longitudinal track. The SMPTE/EBU time code that is coded to 80 bits per 1 frame is recorded on the longitudinal time code track.

Appendix A
MIB and Trap Description

This section describes the MIB and trap description implemented in the e-VTR.
The tree structure of the extended MIB is as follows:


0
ccitt
1
iso
2
joint-iso-ccitt
0
std
1
red
authority
2
member
body
3
org
6
dod
1
internet
1
directory
2
mgmt
3
experimental
4
private
1
mib-2
1
enterprise
1
system
2
interfaces ···
10
transmission
11
snmp ···
122
sony
....
xxx
sysDescr ...... sysName
8501
professionalV1
2
proV1Comon
For further items,
refer to the tree in the list.

Implemented MIB

The e-VTR implements the following MIBs:

MIB-2

MIB-2 is the most representative standard MIB and is implemented by many kinds of network devices.
As network traffic and statistical information of send/receive packets are defined and polled regularly, their changes and transitions can be monitored. In addition, the management items that should be included by TCP/IP devices are difined, so that useful information for monitoring network communication status can be obtained.
For the details about the MIB-2, refer to store-bought books and others.

Note

As for the variables of sysContact, sysName, and sysLocation, only 32 characters are significant by e-VTR though MIB-2 is defined to accept up to 255 characters.

SONY-PRO-MIB

SONY-PRO-MIB is one of the common MIBs in the Pro-AV MIB system. It is an extended MIB commonly implemented on Sony broadcast/professional A/V devices. The following information can be obtained.

Product ID information:
- Product information such as model name, destination, serial number and the like
- Information such as firmware name, version and the like

Agent information:
- Definition information of category MIB implemented (SONY-PROVTR-MIB)
- Setting information of trap destination IP address
- Information of remote manintenance using ftp or http, its function, protocol, method and the like
- Local time

Error Status information:
- Error level, code and date/time error occurred

MIB structure is shown in “A-1. SONY-PRO-MIB”.

SONY-PROVTR-MIB

SONY-PROVTR-MIB is one of the category MIBs in the Pro-AV MIB system. It is an extended MIB specifically containing information common to VTRs among broadcast and professional A/V devices.
The following information can be obtained.

VTR Status Information:
- Operating status
- Video/Audio channel condition
- Count of servo lock status and lost lock status
- Time code

VTR Counter Information:
- Operating hours, drum rotating hours, tape running hours, tape threading counts and others

Trap Control Information:
- Trap control information such as notice of servo lost lock status and the like

MIB structure is shown in “A-2. SONY-PROVTR-MIB”.

Note

Pro-AV MIB is a MIB system developed to apply various information of broadcast and professional A/V devices to the other devices widely and commonly. Pro-AV MIB is composed of the MIBs such as the common MIB that manages general information common to all devices, the category MIB that contains information common to specific devices, and the product MIB that is for unique information of specific products.

Information sent by Traps

The e-VTR sends the following events to SNMP manager using traps.

coldStart:

This trap is sent when the e-VTR is started and SNMP Agent becomes operable.
SNMP manager detects that the e-VTR is restarted.

authenticationFailure:

This trap is sent when SNMP accesses the e-VTR illegally (community name conflict).
You can set whether the e-VTR transmit this trap using the authentication trap or not with SNMP setting window. The setting value is linked to snmpEnableAuthenTraps variables of the MIB-2 snmp group.
SNMP manager detects that unauthorized accesses to the e-VTR from other SNMP maneger.

enterpriseSpecific:

The error notifications of the hard disk that may occur in the e-VTR are assigned to enterpriseSpecific trap.
The trap is respectively sent when the error occurs and when it is cleared. The error description can be referred in the error information table defined on SONY-PRO-MIB.
SNMP manager detects that changes of state peculiar to the e-VTR devices occur.
The description of notification is shown in “A-3. e-VTR Trap”.

A-1. SONY-PRO-MIB

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).sony(122).professionalV1(8501).proV1Common(2)

1				proV1ProductInfo	Product information
	1			proV1ProdIdInfoTable	Product ID information table
		1		proV1ProdIdInfoEntry	Product ID information entries
			1	proV1ProdIdInfoIdx	Product index
			2	proV1ProdIdInfoDevID	Product device ID
			3	proV1ProdIdInfoManufact	Product vendor name
			4	proV1ProdIdInfoModel	Product model name
			5	proV1ProdIdInfoDest	Product destination
			6	proV1ProdIdInfoSN	Product serial number
			7	proV1ProdIdInfoCat	Product category type
			8	proV1ProdIdInfoVer	Product version
			9	proV1ProdIdInfoModelSuffix	Product model suffix
			10	proV1ProdIdInfoVerSuffix	Product version suffix
	2			proV1ModuleTable	Module information table
		1		proV1ModuleEntry	Module information entries
			1	proV1ModuleProdId	Module product index
			2	proV1ModuleIdx	Module index
			3	proV1ModuleType	Module type
			4	proV1ModuleName	Module name
			5	proV1ModuleVer	Module version
			6	proV1ModuleNameSuffix	Module name suffix
			7	proV1ModuleVerSuffix	Module version suffix
2				proV1AgentInfo	Agent information
	1			proV1AgentMIBVer	Version number of Agent MIB definition
	2			proV1AgentMIBCatTable	Category MIB table
		1		proV1AgentMIBCatEntry	Category MIB entries
			1	proV1AgentMIBCatIdx	Category MIB index
			2	proV1AgentMIBCatOID	Category MIB 0ID
	3			proV1AgentMIBProdTable	Product MIB table
		1		proV1AgentMIBProdEntry	Product MIB entries
			1	proV1AgentMIBProdIdx *	Product MIB index
			2	proV1AgentMIBProdOID *	Product MIB 0ID
	4			proV1TrapDestTable	Trap destination table
		1		proV1TrapDestEntry	Trap destination entries
			1	proV1TrapDestIdx	Trap destination address index
			2	proV1TrapDestAddress	Trap destination address
			3	proV1TrapDestEntryStatus	Trap destination address entry status

* : These information are not supported by e-VTR.

	5			proV1RemoteMainteTable	Remote maintenance information table
		1		proV1RemoteMainteEntry	Remote maintenance information entries
			1	proV1RemoteMainteIdx	Remote maintenance index
			2	proV1RemoteMainteFunction	Remote maintenance type
			3	proV1RemoteMainteProtoType	Remote maintenance protocol
			4	proV1RemoteMainteProtoVer	Remote maintenance protocol version
			5	proV1RemoteMaintePath	Remote maintenance access path
			6	proV1RemoteMainteSvcLevel	Remote maintenance service level
	6			proV1LocalClockTime	Product's local clock time
3				proV1ErrorStatus	Error status information
	1			proV1ErrStatTable	Error status table
		1		proV1ErrStatEntry	Error status entries
			1	proV1ErrStatProdId	Error product ID
			2	proV1ErrStatErrIdx	Error index
			3	proV1ErrStatLevel	Error level
			4	proV1ErrStatCode	Error code
			5	proV1ErrStatDescr	Error description
			6	proV1ErrStatTime	Time error occurred

A-2. SONY-PROVTR-MIB

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).sony(122).professionalV1(8501).proV1Category(3)

104				proV1ProVTR		VTR information
	1			proV1ProVTRStatus		VTR status information
		1		proV1ProVTROpStatus1		VTR operating status 1
		2		proV1ProVTROpStatus2		VTR operating status 2
		3		proV1ProVTREdh	*	EDH/EDA status information
			1	proV1ProVTREdhNow		Current EDH flag status
			2	proV1ProVTREdh	*	Sum of EDH flag status
			3	proV1ProVTREdaNow	*	Current EDH flag status
			4	proV1ProVTREda	*	Sum of EDA flag status
		4		proV1ProVTRChCondVideo		Video channel condition information
			1	proV1ProVTRChCondVideoNow		Current video channel condition
			2	proV1ProVTRChCVgood		Sum of good conditions
			3	proV1ProVTRChCVindeterminable		Sum of indeterminable conditions
			4	proV1ProVTRChCVnogood		Sum of no-good conditions
		5		proV1ProVTRChCondAudio		Audio channel condition information
			1	proV1ProVTRChCondAudioNow		Current audio channel condition
			2	proV1ProVTRChCAgood		Sum of good conditions
			3	proV1ProVTRChCAindeterminable		Sum of indeterminable conditions
			4	proV1ProVTRChCAnogood		Sum of no-good conditions
		6		proV1ProVTRServoStatus		Servo status information
			1	proV1ProVTRLostLockSt		Sum of servo lost lock status
			2	proV1ProVTRServoLockSt		Current servo lock status
		7		proV1ProVTRCurrentTimeCode		Current time code information
	2			proV1ProVTRCounters		VTR hours meter information
		1		proV1ProVTRHoursOperation		Sum of operating hours
		2		proV1ProVTRHoursDrumRun		Sum of drum rotating hours
		3		proV1ProVTRHoursDrumRunRst		Sum of drum rotating hours (Resettable)
		4		proV1ProVTRHoursTapeRun		Sum of tape running hours
		5		proV1ProVTRHoursTapeRunRst		Sum of tape running hours (Resettable)
		6		proV1ProVTRThreadCount		Sum of cassette threading
		7		proV1ProVTRThreadCountRst		Sum of cassette threading (Resettable)
		8		proV1ProVTRHoursHead	*	Sum of head used hours
		9		proV1ProVTRHoursHeadRst	*	Sum of head used hours (Resettable)
		10		proV1ProVTRHoursAirFilter	*	Sum of air filter used hours
		11		proV1ProVTRHoursAirFilterRst	*	Sum of air filter used hours (Resettable)
	3			proV1ProVTRTrapControl		Trap control information
		1		proV1ProVTRTrapCntVideo		Threshold of video condition trap
		2		proV1ProVTRTrapCntAudio		Threshold of audio condition trap
		3		proV1ProVTRTrapCntLostLock		Servo lost lock trap setting
		4		proV1ProVTRTrapCntEDH	*	EDH trap setting
		5		proV1ProVTRTrapCntEDA	*	EDA trap setting

* : These information are not supported by e-VTR.

A-3. e-VTR Trap

Level	Code	Description	Remarks
Critical	ERROR-01	REEL TROUBLE-1	For details, refer to "2-2. Details of Error Messages"
Critical	ERROR-02	REEL TROUBLE-2	
Critical	ERROR-03	REEL TROUBLE-3	
Critical	ERROR-04	REEL TROUBLE-4	
Critical	ERROR-05	REEL TROUBLE-5	
Critical	ERROR-06	TAPE TENSION ERROR	
Critical	ERROR-07	CASTAN TROUBLE	
Critical	ERROR-08	DRUM TROUBLE	
Critical	ERROR-09	TH/UNTH MOTOR TIME OUT	
Critical	ERROR-0A	THREADING TROUBLE	
Critical	ERROR-10	HUMID	
Critical	ERROR-11	TAPE TOP/END SENSOR TROUBLE	
Critical	ERROR-12	TAPE TOP SENSOR TROUBLE	
Critical	ERROR-13	TAPE END SENSOR TROUBLE	
Critical	ERROR-14	FAN MOTOR TROUBLE	
Critical	ERROR-20	CASSETTE COMPARTMENT MOTOR LOCK	
Critical	ERROR-21	REEL SHIFT MOTOR LOCK	
Critical	ERROR-22	REEL POSITION SENSOR TROUBLE	
Critical	ERROR-23	THREADING RING POSITION ERROR	
Critical	ERROR-92	INTERNAL INTERFACE ERROR 1	
Critical	ERROR-93	CPU INITIALIZE ERROR	
Critical	ERROR-95	OTHERS NV-RAM ERROR	
Critical	ERROR-96	SY NV-RAM ERROR	
Critical	ERROR-97	SV NV-RAM ERROR	
Critical	ERROR-98	RF NV-RAM ERROR	
Critical	ERROR-99	INTERNAL INTERFACE ERROR 2	
Major	MAJOR-01	AUDIO REC CONDITION RED at TC hh:mm:ss:ff	An Audio channel condition error was detected during recording.
Major	MAJOR-02	VIDEO REC CONDITION RED at TC hh:mm:ss:ff	A Video channel condition error was detected during recording.
Major	MAJOR-03	AUDIO PB CONDITION RED at TC hh:mm:ss:ff	An Audio channel condition error was detected during playback.
Major	MAJOR-04	VIDEO PB CONDITION RED at TC hh:mm:ss:ff	A Video channel condition error was detected during playback.
Major	MAJOR-05	LOST LOCK occurred at TC hh:mm:ss:ff	The servo lock was released during playback or recording.
Warning	WARNING-01	REFERENCE MISSING	The reference signal does not exist, or it is not synchronized with the input signal.

For the U.S.A. and Canada

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)

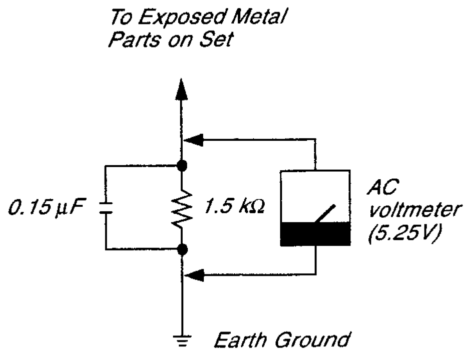


Fig A. Using an AC voltmeter to check AC leakage.

HDW-2000 (SY)
HDW-D2000 (SY)
HDW-M2000 (SY)
HDW-M2000P (SY)
HDW-M2100 (SY)
HDW-M2100P (SY)
HDW-S2000 (SY)
HDW-S2000P (SY)
DVW-2000 (SY)
DVW-2000P (SY)
DVW-M2000 (SY)
DVW-M2000P (SY)
MSW-2000 (SY)
MSW-2000 (CN)
MSW-A2000 (SY)
MSW-A2000P (SY)
MSW-A2000P (CN)
MSW-M2000 (SY)
MSW-M2000P (SY)
MSW-M2000P (CN)
MSW-M2000E (SY)
MSW-M2000EP (SY)
MSW-M2000EP (CN)
MSW-M2100 (SY)
MSW-M2100P (SY)
MSW-M2100P (CN)
MSW-M2100E (SY)
MSW-M2100EP (SY)
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